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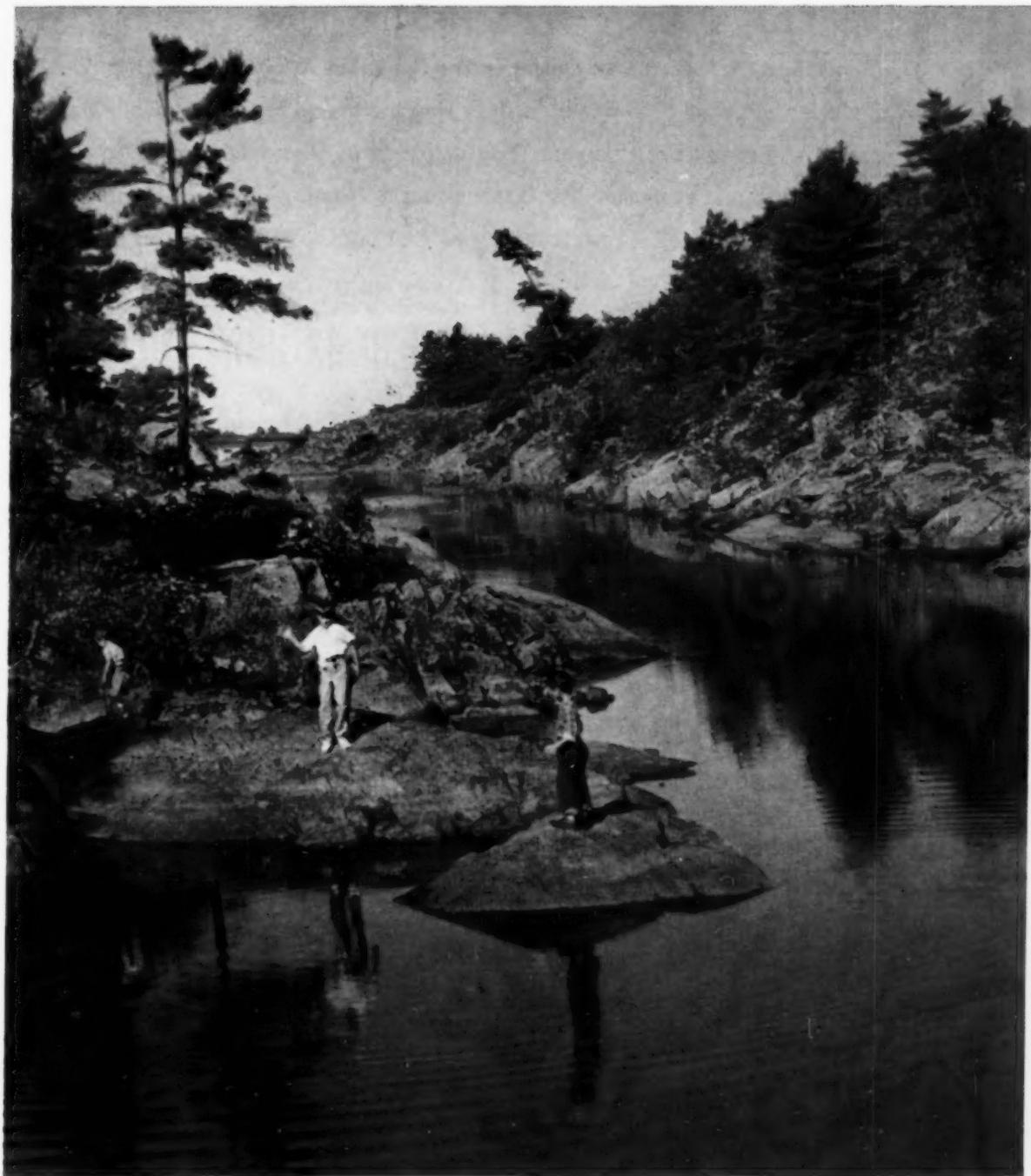
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Malak

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The articles in this Journal are indexed in the *International Index to Periodicals* and in the *Canadian Index*.

The British standard of spelling is adopted substantially as used by the Government of Canada and taught in most Canadian schools, the precise authority being the Concise Oxford Dictionary, fourth edition, 1951.

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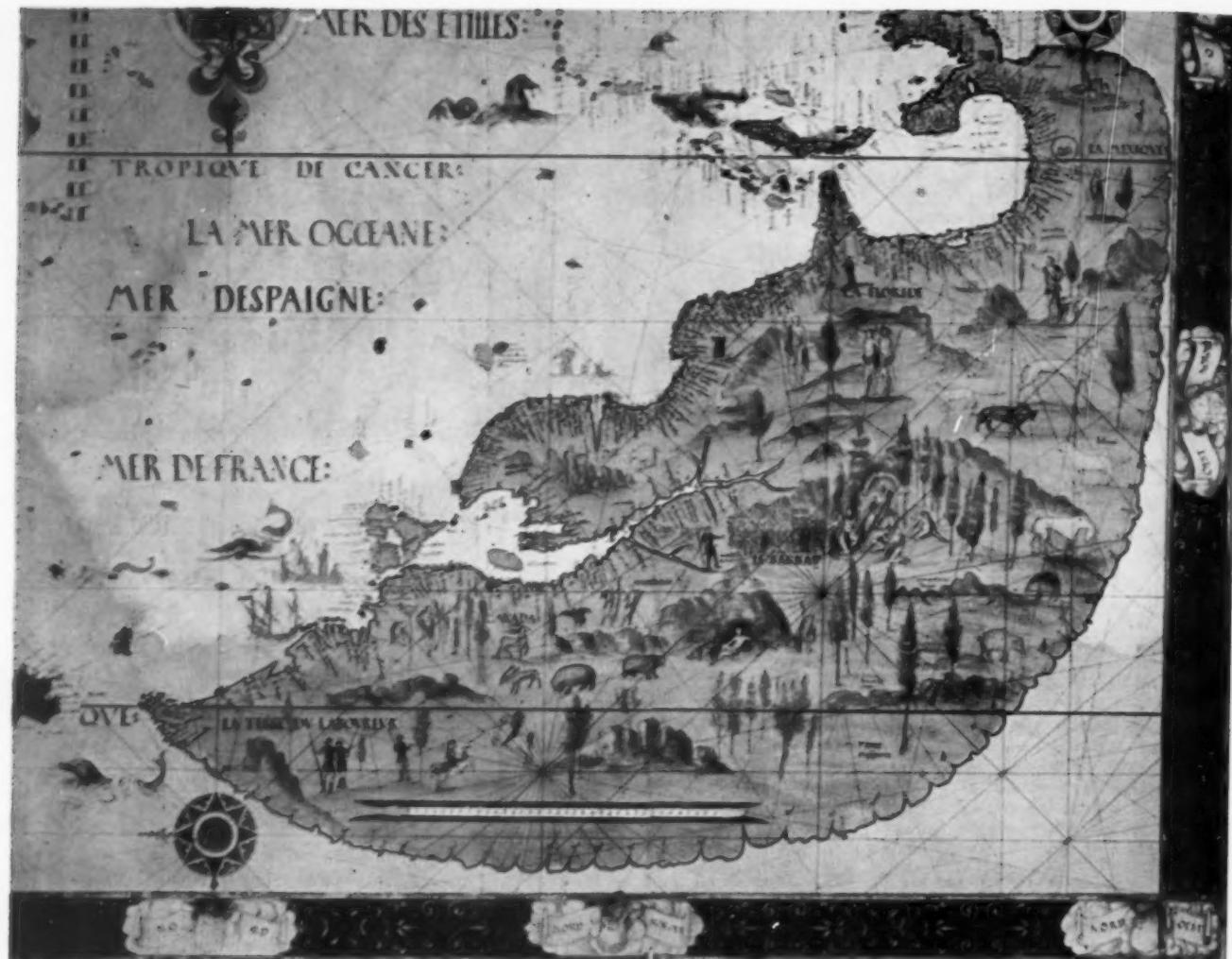
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GEORGE F. HENDERSON Europe: S/L W. H. CORKILL, M.B.E.,
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The map shown above is a reproduction of a copy of a map published in 1854*. The original map was done by the famous cartographer, Pierre Descoliers, on parchment ca. 1542-46. Descoliers was a contemporary of Jacques Cartier, and is believed to be the first cartographer to have copied Cartier's own maps (now lost) of his explorations. The map above most probably incorporates features of Cartier's own maps, and is a section of a large map of the world.

Public Archives

Legend and History in the Oldest Geographical Names of the St. Lawrence

by MARIUS BARBEAU

Drawings by Bert Sureties

THE REPERTORY of geographical names along the St. Lawrence River has been enriched from various sources. It has opened the door wide to legend and adventure; it has received a large influx of Indian names; and it bears the mark of physical features, landmarks, and natural resources. European proper names in the old style, religious or secular, were of course bound to enter with the tide of colonization. These are often colourful and significant.

Among the names derived from legend and adventure, we find *Chaffaud-aux-Basques*,

Isle-aux-Basques, and several names of localities like *Forillon*, which allude to the early fishermen and whale hunters; these go back to the dawn of historical times on this continent. Fisherfolk from the Pyrenees on the frontiers of Spain, and from Brittany and Normandy, crossed the Atlantic during the Middle Ages and pursued their catch to the banks of Newfoundland, the Gulf of St. Lawrence, and even a short distance up the river as far as the Saguenay River and the south shore opposite. Near the mouth of the Saguenay they built a *chaffaud*, that is, a

**Les Monuments de la Géographie*, published by M. Jocard: pl. XIX, 1. Paris, 1854. The map bears the title: *Mappemonde Peinte Sur Parchemin Par Ordre de Henri II, Roi de France. (Partie I.)*

framework and rack on which to dry the codfish. Across the river to the south they rendered the blubber of whales at Isle-aux-Basques. At *Forillon*, a cliff on the point between Cap-des-Rosiers and Bay of Gaspé, stood a structure like a small lighthouse (*forillon*) where the fishermen kindled their fires at night to attract the fish into their weirs.

Almost at the same time and in the same region the Mohawks, an Iroquois nation living in a part of what is now the State of New York close to Vermont, waged a war of invasion against the Miemaes, the Montagnais, and other Algonkian nomads of the northeastern woodlands. One day they encountered a party of Miemaes who had taken refuge on the small island now bearing the name of *Ilet-au-Massacre* (Rimouski). The Iroquois killed them to the last man. As late as fifty years ago, the country folk of Rimouski county round about claimed to have found the bones of these victims of the Iroquois in a cave on the *Ilet-au-Massacre*. This episode in the feuds of the Indians at the end of Canadian prehistory is dated by Taché, who attributes the following narrative to Jacques Cartier (1535). Here it is in brief:

"Donacona [the head chief of the Indian town of Stadacona] says that the Trudamans from the south constantly raided the country of the Saguenay and of the Hungeda [now Gaspé]. Two years ago, on the south shore, they fell upon 200 men, women, and children asleep in a barricade they had erected on an island. The Trudamans set the barricade on fire, and slaughtered the occupants, all but five, while they were trying to escape. . . , whereof they could still show the proof — in not a few scalps."

Even when allies of the white men, the Indians were by no means all of a friendly disposition; they occasionally struck blows at the French missionaries and the *coureurs-de-bois* in their midst. Brûlé, the adventurer who first discovered Ontario around 1615, was slain by the Neutrals (a Huron nation); and several Jesuits shortly afterwards fell under the tomahawks of the Hurons and the Five Nations. Father Viel, another missionary, was drowned at *Sault-au-Récollet*, in 1625.

Hence the familiar name of *Sault-au-Récollet* on the Island of Montreal, close to the city. According to the early relations, Père Viel was journeying down the Rivière-des-Prairies in a birchbark canoe, accompanied by a young Indian convert named Ahuntsic. Both were ambushed by Iroquois raiders while setting up a camp for the night. Having tortured the missionary, the Iroquois threw him into the rapids to drown and inflicted a similar martyrdom on the neophyte. *Ahuntsic* now is the name of a village near *Sault-au-Récollet*.

Not all the old geographical names go back to the dim or tragic past. One of them at least evokes a satirical comment upon the self deceit of the famous discoverer, La Salle. For *Lachine*, a geographical name on the St. Lawrence just above Montreal goes back to 1673 or 1675. On a map of that date we read "habitant de Lachine", for this was the *seigneurie* of Sieur de La Salle.

In 1669, La Salle started off in a birch-bark canoe for unknown lands to the west, to pursue the search for a passage to Sipangu and Cathay (Japan and China). His companions were two Sulpician fathers, Dollier de Casson and De Galinée, and the party embarked in four canoes and fourteen men equipped by La Salle, three canoes and seven men equipped by the Séminaire de Saint-Sulpice, and two canoes with Iroquois guides. In September, 1669, the party reached Niagara and met the explorer Joliet who no doubt dispelled the illusions of the sanguine explorer from the rapids above Montreal. La Salle decided to retrace his steps — not without fear of ridicule. Indeed, the name of La Chine, or "China", henceforth stuck like glue to the explorer's own domain. Dollier, who invented this name Lachine, says that La Salle's party of "Chinois" (Chinese) was welcomed home with good-natured derision. Yes, they had been bound for the Celestial Empire, but here they were back, empty-handed and somewhat wiser.

Indeed, the search for gold and diamonds had prompted the discoverers of the New World from the start and had led them blindfold into high adventure. The "Kingdom of Saguenay" proved to be naught but a legend which Cartier had come upon in an encounter with the Agouhanna, or Chief, of

Hochelaga. Because this chief had pointed in the direction of the Ottawa River and the Saguenay, after marvelling at a brass whistle hanging from the neck of the Breton pilot, it was presumed forthwith that in the Saguenay "gold and rubies were found in plenty."

Not only in that northern region, then out of reach, were gold and diamonds to be picked up by all comers. Even at *Cap-Rouge*, a few miles above Quebec, gold dust and flakes were gathered by the barrel and rushed to France — and this in the year of grace 1536. Diamonds, so we read in musty records, were picked up at what was first called *Cap-aux-Diamants*, now Cap-Diamant, in the present city of Quebec, only to be called sarcastically by the jewelers of old France, "Diamonds from Canada" — that is, worthless. Cap-Rouge and Cap-Diamant are present-day sites of erstwhile fantasies of fairyland. Even the sober-minded Champlain tells us that "along the cliffs of the said Quebec, diamonds were found that are of finer water than those of Alençon" — this is not saying much of French diamonds! In his Relation of 1633, he adds: "A quantity of small diamonds of fair lustre exist there." Let anyone who would now seek diamonds search near Dufferin Terrace in Quebec, under the shadow of Cap-aux-Diamants!

The name of *Ile d'Orléans*, in the neighbourhood of Quebec, is not the earliest given to this large island in the St. Lawrence. At first

it was called "Isle de Bacchus" because of its abundance of wild grapes. This name also reflects the credulity of the times, for the sailors, when they landed there, were so impressed with the effusions of the Stadacona natives, who mistook them for supernatural beings, and so entirely under the delusion of



having landed in a treasure island, that they indulged in riot and license. They behaved as if they had actually entered the Arcadian kingdom of Bacchus. Hence the name!

No sooner were they brought back to their senses by the scurvy that decimated them during their first Canadian winter than they scurried back home in the spring — or what was left of them. The more conventional name of Orléans was soon substituted for that of Bacchus; it was given in honour of the Duke of Orleans, a leading French nobleman who never set foot in the New World.

The early discoverers were apt to distil geographical names out of their novel experience in the new land. Yet these often fell short in local colour or inventiveness. For instance, a more fitting name might have been chosen by Jacques Cartier for the gulf and immense river of *St. Lawrence*. Already, the river had been called "Rivière des Molues" (codfish), or again, "Grand Rivière". But fate had it otherwise. On the day when Cartier anchored in an inlet north of the gulf, he set



a pious finger on the liturgical calendar and read St. Lawrence Day. This name later spread from the inlet to the whole gulf, and then to the entire river. In fact, the name spread so far — and for no very good reason, since Lawrence was a colourless Roman saint of the fourth century — that it embraced a major part of the continent, as far as the Great Lakes. It even threatened to root out the name of Orleans for the island opposite Quebec; for a period this island ceased to be known under that name, to become "Isle Saint Laurent." It even evicted St. Paul, a far greater pillar of the Church, from his stronghold in the ancient parish of St. Paul on the island of Orleans, which became St. Laurent.

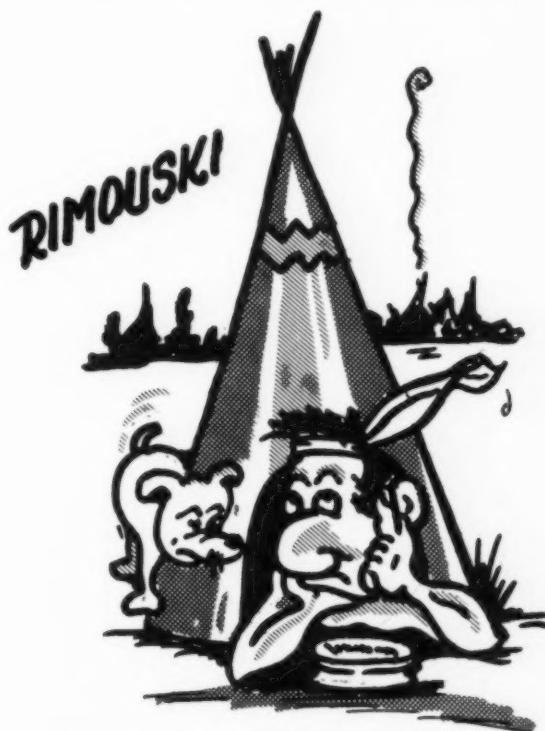
Saints' names have always enjoyed the inside track in the selection of geographic names under the aegis of a powerful church, to the point of provoking the remark upon a perusal of the provincial map where one reads so many Saint-so-and-so's, that our map is a "martyrologe géographique" — a geographic martyrology. French Canada, however, does not differ in this respect from other Latin or Roman Catholic countries. "Saint", along the St. Lawrence, is the equivalent of *San* and *Santa* (from the Latin *Sanctus* and *Sancta*), which occur so frequently in Italy, Spain, Mexico and South America.

The devil also found his due. On our map east or west, north or south, wherever early French Canadians set foot as *royageurs* or *coureurs-de-bois*, there is a good sprinkling of satanic parlance. How many Devil's Canyons, Hell's Gates — Rapides-du-Diable, Cap-au-Diable, Caverne-du-Diable, Porte-de-l'Enfer, Grand-Méchin, Rocher-Malin, we find at random, as if to dispel the dullness of ubiquitous sanctity!

There were not always clear reasons for thus giving the devil his share at these points on our landscape. With some, the presence of a forbidding physical feature that seemed diabolical gives the answer. Legend may explain other names, for instance *Rocher-Malin*, in Temiscouata county, near Rivière-du-Loup on the south shore below Quebec. Rocher-Malin, at the northern end of the historic Temiscouata trail from the Maritimes to the St. Lawrence, was once haunted. It had

long been a meeting place of Indians and white men who trekked back and forth. At Rocher-Malin they relaxed and refitted for further exertions in canoes or along the wild trails. Here Beelzebub played host to them. High spirits entered into the game, peppered the language with invectives, and spurred on the imagination. An island within sight is still called the Brandy Pot. Charlo, as the devil was called at Rocher-Malin, lurked around in the dark with horns, hoofs, and a tail tipped with a red arrow, just as cunning as he has been elsewhere! He is still the object of many jests, pranks, and funny tales. Nowhere is this so true as at Rocher-Malin, except perhaps at *Grand-Méchin* (The Great Evil One), in Gaspé.

The devil was not the only claimant of ancient privilege. Other spirits, some of them



fearful, others simply prankish, held sway over creeks, bays or inlets, rocks and caves, particularly in Gaspé and on the North Shore towards Labrador. There we hear of places like *Anse-Pleureuse*, *Braillard-de-la-Madeleine*, and others, where weeping elves, ghosts, dwarfs, and fairies, or keepers of buried treasures, at times made their appearance and frightened away the simple passers-by.



NATASHQUAN

So the story goes; we should say stories, for they are many. *Pont-des-Chicanes* (or Chicanery Bridge) at *Cap-Chates* was once haunted by countless tom cats who talked like human beings, and all by themselves held the fort at night. But this was only because the folk on either side of the river could never agree on the manner of building or who was to finish the job!

Beginning with the name of Canada itself, geographic nomenclature has been extensively borrowed from prehistoric or indigenous sources.

Canada is derived from an Iroquois-Huron word: *Kandata*, *Wendata*, *Yandata*, meaning "It's a village", or "villagers." Jacques Cartier himself recorded this meaning from natives



of Stadacona and Hochelaga, just as we may now from any Iroquois informant. The domain known by that name extended at

first only from *Isle-aux-Coudres* (Hazel Island, 60 miles below Quebec) to *Hochelaga* (now Montreal). Thus, the earliest Canadians were Hurons, then the Indians of the northeastern woodlands; soon the term embraced the entire basin of the St. Lawrence; later, the name was applied to the French-speaking inhabitants of the region. The Acadians of the maritime coasts were excluded from this appellation; their own vocable was derived from the Miemae word *Cadie*; and they were known as *Cadiens* or *Cayens*, and *Cadjuns* in Louisiana, where they migrated after their deportation from Grandpré in what is now Nova Scotia. It was only in the nineteenth century that the name "Canada" began to



spread westward and covered the two political subdivisions of the Upper and Lower Canada. The Great Lakes, the prairies, the Rockies, Rupert's Land and the Arctic regions still remained outside, as the wild, wooded territories of the Hudson's Bay Company and of adventurers who claimed exclusive privileges. Canada annexed the western prairies shortly before the Riel Rebellion in the early 1880's, and British Columbia entered the Confederation, after some soul searchings, later than the other provinces. And so Canada as a name now stretches out to three oceans, the Atlantic, the Pacific, the Arctic, north of the American boundary.

Other Indian words became the names of familiar spots on the map of Eastern Canada:—

LEGEND AND HISTORY

Quebec, meaning narrows or straits, from the constriction of the waters of the St. Lawrence between the cliffs of Levis and Cape Diamond. Previously, by Jacques Cartier, it had been called Stadacona.

Hochelaga or *Hochelagay* or *Osarake*, "beaver dam", from a beaver barrage on a creek in front of Mount Royal.

Caughnawaga or *Caughnawagay*, "in the rapids", now the Iroquois Mission village opposite Lachine, at Sault St. Louis.

Gaspé, Miemac for "land's end." In the days of Jacques Cartier it was called Hunguedo by the Iroquois raiders and fisher folk in the Bay of Gaspé.

Oka, on Lake of Two Mountains, formerly *Kanesatake* in Algonkin, a "golden fish".

Madawaska on the frontier of Quebec and New Brunswick, "land of the porcupine."

Matane, Miemac for "beaver dam".

Matapedia, in the same dialect, "forked river".

Memramcook, on the St. John River in New Brunswick, "sandy soil".

Metabetchouan, near Lake St. John, in Montagnais, "junction of the river and the lake waters".

Mingan, "wolf".

Miscou, "praies of wild hay".

Mistassini, "back cliffs".

Natashquan, "bear hunting grounds".

Nipigon, "deep clear water lake".

Nipissing, "in the shallow water".

Nominingue, "vermilion paint".

Shawinigan, "portage over the crest".

Chipogamu (*Chibougamau*), "small narrow waters".

Chicoutimi, "the end of deep waters".

Escoumains, "where the ground apples still grow".

Kamouraska, "wild hay on the far side of the water".

Betsiamits, "where sea eels run upstream".

Bouctouche, "the best small harbour".

Cacouna, "home of the porcupine".

Cascapedia, "swift current".

Kenebec, "leading on to the lake".

Kenogami, "long lake".

Coaticook, "river shore where the pine grows".

Manouan (on the upper St. Maurice), "gathering edge".

Mascouche, "small bear".

Maskinonge, "large pike".

Memphramagog, "big expanse of water".

Metis, "birch".

Paspebiac, "sandy point forward".

Peribonca, "digging in the sand".

Petawawa, "noise from the lake coming north".

Rimouski, "the dog house".

Restigouche, "place where the squirrel quarrels".

Saguenay, "water gushing forth".

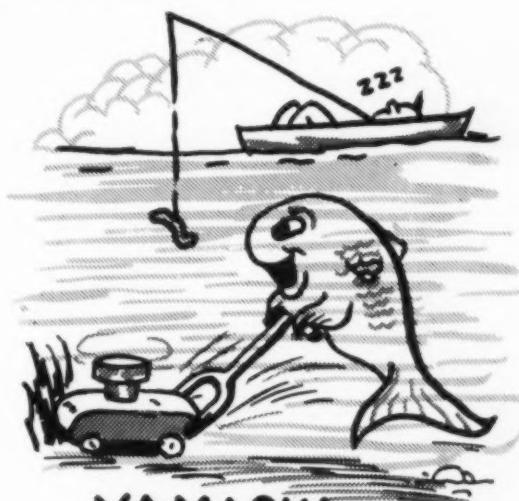
Shipshaw, "river shut in".

Tadoussac, "round breasts".

Temiscouata, "lake at the head of the river".

Temagami, "deep lake".

Ungara, "unknown land". (*Umgabaw*, Eskimo for "far away").



YAMASKA

Yamaska, "hay at the bottom".

Ontario, "beautiful or large lake".

Toronto, "tree sticking out of the water".

Almost all these Indian names of Algonkin or Iroquoian derivation bring out some feature of their varied locations. So do French names given by the early newcomers, for instance:

Isle-aux-Coudres, "hazel island" which Jacques Cartier described as "covered with nuts as large and of better taste than ours" (in France).

Isle-aux-Grues, "crane island", because cranes stop over there in their migrations.

Heron Island (near Montmagny), where as Champlain remarked, "the sky was covered with them".

Isle-aux-Lièvres, "hare island", peopled with hare.

Ile-aux-Oeufs, because of the eggs of its nesting birds (*margaux* and *godets*).

Ile-aux-Oies, the home of wild geese, ducks, bustards.



Cap - à - l'Orignal (Rimouski): a moose, pursued, jumped over a cliff.

La Canardière, near Quebec, where wild ducks nested in numbers.

Capucin (Gaspé). Its profile is like a hooded monk.

Cap-Tourmente, from Champlain's observations that "as soon as the wind rises, the sea stirs up as if it were full".

Cap d'Espoir, "Cape Hope", which was misunderstood in English and is still written on present-day maps as Cape Despair!

Often enough, a geographical name is drawn from an historical fact or from a reminiscence, as are *Anse-du-Fort*, and *Anse-des-Mères*. The first is at the point of the Island of Orleans facing Quebec, because in 1660 the Hurons after being driven out of their country in Ontario, sought shelter in the small bay at the tip of the island and there

erected a palisade to protect their bark huts. The second is so named because the nuns, here called "mothers", from the earliest colonial times owned a small bay, above Quebec, and every year had fish fences erected.

La Route-des-Prêtres, crossing the Island of Orleans between St. Pierre and St. Laurent, assumed the name of the Priest's Road, not that priests ever lived there, but because of a feud between two parishes over the possession of some relics — the bones, if you please, of St. Paul and St. Clement, then the patron saints of the two parishes. Feelings once ran high at St. Pierre when the precious bones of St. Clement were stolen at night by neighbours in the parish of St. Laurent who claimed a vested right in these relics. After thirty full years of parochial bitterness in which members of the clergy were involved, the Bishop had to step in and make a ruling in the face of threatened defiance: the relic in dispute — the arm bone of St. Clement — was to be restored on the appointed day to the parish of St. Peter during a procession with banners flying which issued forth from both parish churches and met on the boundary line on a certain day in the midst of a thick maple-sugar bush; and the parish priest of St. Laurent was to hand over its stolen relic to the parish of St. Pierre, so long deprived of its heirloom and deeply aggrieved, if not cantankerous. All this happened over two hundred years ago, between 1698 and 1733. But however long ago, and how seemingly trivial the dispute, the name of the Priest's Road still lingers, with its reminiscence of the times of old when saints actively patronized their parishes but could not curb the foibles of their flock or their way of making mountains out of mole-hills!





*The above map is a redrawing of a copy of an original map contained in the *Atlas of Nicolas Vallard of Dieppe* (1547) which is now in the Huntington Library, San Marino, California. The original map is believed to be the work of a Portuguese cartographer done prior to 1547*, and is based upon Jacques Cartier's explorations.*

Public Archives

*See Harrisson, Henry. *Découverte et Evolution Cartographique de Terre-Neuve et des Pays Circonvoisins*: p. 227. Paris and London. 1900.



The tall curing kilns dominate the tobacco fields of Norfolk County, Ontario. In this picture, all are full except the far one which is being filled.

T. L. Silverthorne

Tobacco: Another Canadian Achievement

by MARCUS VAN STEEN

ONE OF THE unexpected results of the first Great War was to provide the depressed agricultural counties of Southern Ontario with a cash crop that is among the most valuable in Canada. The light sandy soil of the counties that lie due north of Lake Erie was never much good for anything before the cigarette became the most persistent habit indulged in by Canadians male and female, young and old. It was then found that the Bright Virginia flue-cured leaf from which cigarettes are made flourished in the infertile sand of Elgin, Oxford, Norfolk, Brant and Middlesex counties, and the discovery was something like the first glint of gold in the Klondyke.

This year, 4,578 farms in Ontario are growing an estimated 175,000,000 pounds of this cigarette tobacco, with a value expected to reach \$85,000,000, making it the most valuable cash crop in the province.

Tobacco is far from being a new crop in Canada. The Indians were growing it before the coming of the White Man. The French colonists chewed the leaf, or smoked it in pipes. They grew enough for their requirements, even though successive governors legislated against it. By the time the English came to Canada they had gained considerable experience of tobacco in their more southerly colonies, and they tried to encourage its production in Quebec. They soon gave it up,

TOBACCO: ANOTHER CANADIAN ACHIEVEMENT

however, because the leaf grown in Quebec was so much coarser and ranker than the Virginia product which they had grown to like.

For most of the 19th Century, tobacco was a very minor crop in Canada, grown solely for local consumption. In addition to being grown in Quebec, it was grown also in Essex and Kent counties in Ontario, where the descendants of United Empire Loyalists from the tobacco areas to the south were still trying to recapture the prosperity which tobacco had brought to their forbears. In 1890, one of these persistent experimenters tried out a new type of white burley tobacco first grown a few years before in Ohio. Burley, suitable for chewing plug, pipe tobacco and snuff, was originally solely a dark tobacco, distinguished by its reddish leaf. It takes a long time to mature, and never was satisfactorily grown in the short Canadian season. The lighter coloured white burley,

however, was a faster growing variety, and within a few years it became an important crop in Essex and Kent counties.

In 1900 production amounted to several million pounds — enough to warrant protection — and Canada's first tobacco tariff was imposed. This encouraged manufacturers to set up plants to process and pack the product, thus giving Canada its first tobacco industry. By 1913 production of burley was about 13,000,000 pounds a year, a level that is not exceeded today because the demand for chewing and pipe tobacco and snuff remains much as it was. What has caused the rapid growth of the tobacco industry in Ontario is the cigarette which, between 1914 and 1918, became increasingly popular with the men in Canada's armed services and with the women in Canada's war industries. Following this introduction, the habit grew phenomenally. In 1920 Canadians smoked 2,000,000,000 cigarettes, most of which were either import-

Aerial view of a typical tobacco farm in Southern Ontario.

Imperial Tobacco





Selecting seedlings from a greenhouse bed for transplanting in the fields.

Imperial Tobacco

ed or made from imported leaf. In 1959 Canadians smoked some 34,000,000,000 cigarettes, practically all of them manufactured in Canada from home-grown leaf.

This meant a great deal to the farmers trying to scratch a living from the poor, thirsty soil of the counties just north of Lake Erie, for the cigarette as most Canadians know it requires a tobacco partially starved in poor soil so that it will have a light texture, a delicate flavour and a pale colour.

The implications of this were quickly realized by some of Canada's farm experts, who had been looking for a crop for these arid counties. Prominent among these pioneers was Professor Archibald Leitch, who graduated from the Ontario Agricultural College in 1905 and, after ten years of practical farming, returned to join the faculty of the college convinced that he had found an answer to the problem of farming in Southern Ontario. During the next 13 years Professor Leitch worked to persuade Ontario farmers that in the new Virginia cigarette tobacco they had a crop that would flourish even in their light soil. In 1928 Professor Leitch left the Ontario Agricultural College to go into tobacco farming himself in the Delhi area. Meanwhile, the growers were taking readily to the new crop — men like Francis Gregory, who first started growing Virginia leaf near Leamington, went on to own more than twenty farms in Kent, Elgin and Norfolk counties, became one of

the founders of the Ontario Flue-Cured Tobacco Growers' Marketing Board, and earned the title of The Grand Old Man of Canadian Tobacco.

Perhaps even more arresting is the story of Robert Longhurst, who arrived in Canada from his native Cork in 1928 under an immigration scheme by which he went to work for an Ontario farmer who gave him board and lodging and \$10.00 a month, of which \$9.00 went to pay back his fare to Canada. The following year, looking for a better financial arrangement, Longhurst had no hesitation in going into tobacco where, as he puts it: "I was offered \$75.00 on a tobacco farm, which seemed overwhelming when the best I could make in general farming at that time was \$25.00 a month." By 1931 Longhurst was running his own tobacco farm on a share basis and today he owns two tobacco farms near Brantford, totalling about 150 acres.

The acreage which each grower puts into tobacco each year is determined by the Ontario Flue-Cured Tobacco Growers' Marketing Board, which tries to regulate production to meet the demand. Usually this is about one-half of each farmer's available tobacco land, since rotation is essential to well-developed, disease-free plants. The usual alternative crops are rye, wheat or oats, for which the light soil of this tobacco-growing area must be heavily fertilized. Some farmers also keep a few pigs and chickens, and grow

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some potatoes and corn, but, as Longhurst says: "If you do too many things you are bound to neglect some, and to make the most out of tobacco you have to pay full attention to what you are doing."

That tobacco is worth paying attention to is shown in the fact that in Brant County the 1958 tobacco crop was worth \$784 per acre, and in Middlesex, \$746 per acre. In Norfolk, which grows 45 per cent of all Canada's tobacco, the crop was worth \$730 per acre.

The figures were not quite so good for 1959, when a combination of a dry summer, several hail storms, and a killing frost in mid-September before all the crop was in, reduced production to a total of 150,000,000 pounds, as compared with 180,000,000 pounds in 1958.

The tobacco grower's year starts in early April when he plants the seed in sterilized and fertilized soil in unheated greenhouses. In May the sturdiest seedlings are transplanted in parallel rows in the fields, which have been sprayed against wireworm and cutworm. Tobacco has one other major insect pest, hornworm, against which the plants are sprayed just before harvest time. A much more serious threat is hail, which can rip the broad leaves to useless shreds. Against this danger the grower takes out insurance, paying from \$10 to \$13 per acre, depending on the region, for coverage of \$100 per acre for total loss of crop.

During the summer the tobacco must be irrigated and fertilized. Because it is grown in soils that are low in nutrients, the rate at which the Virginia tobacco grows and matures can be regulated closely by the amount of water and fertilizer that is given to it. Given a hot enough summer, it can be speeded to maturity in about 125 days, which allows this tobacco to be grown successfully in counties as far north as Simcoe, Renfrew and Bruce, where the season used to be regarded as too short. It is also being introduced into Manitoba.

Ontario now produces 94 per cent of Canada's \$90,000,000 tobacco crop, and nine-tenths of Ontario's production is Virginia leaf grown in Norfolk, Elgin, Oxford, Middlesex and Brant counties, where tobacco is the most important economic factor. This is evident to anyone driving along the highways

in these counties. From mid-May, when the plants are transferred from the greenhouses to the fields, until mid-September, when the harvest usually ends, the landscape presents a regular pattern of luxuriant dark green squares dominated by the tall, brightly-coloured curing kilns, six or eight to a farm. These kilns, with their tall chimneys, set an unmistakable seal upon the tobacco country whatever the season. In August and September an additional element is added, when 65,000 workers invade the fields to gather the leaves and fill the kilns for curing. These workers include about 23,000 men and women from Quebec and the Maritimes and about 2,000 expert curers from the tobacco regions of Georgia, the Carolinas and Virginia. The remaining 40,000 workers come from local farms, adjacent towns and from other parts of Ontario — students and even a few teachers from Toronto, London and Kingston, housewives who grew up on farms and who look on the tobacco harvest as a



Transplanting seedlings by means of a tractor-drawn double-row planter.

Imperial Tobacco



The growing tobacco needs about an inch of water a week. Irrigation is necessary in some parts of Southern Ontario.

T. I. Silverthorne



The grower snaps off the flower-bearing top by hand to develop the leaf.

Imperial Tobacco

The primers start with the bottom leaves pulling them two or three at a time as they mature. The crop is gone over four or five times during one harvest.

T. I. Silverthorne



paid vacation, Indians from the Six Nations Reservation at Brantford, unemployed miners from Sudbury, farmers from unproductive regions of Northern Ontario, temporarily idle fruit pickers from the Niagara Peninsula, and immigrants too newly arrived in the province to have obtained regular employment. The lure is wages ranging from \$12.00 to \$15.00 a day for healthful, open-air work that is tedious and tiring but is not really very strenuous once a person gets used to it.

Most of these field workers congregate in the five main tobacco counties, where 106,300 acres are devoted to tobacco, out of a total of 140,000 acres that may grow Virginia flue-cured tobacco in Ontario. All other kinds of tobacco grown in Canada use only 24,000 acres, of which 11,000 acres are in Quebec.

Each tobacco crew consists usually of nine men and six women, who can handle the average tobacco farm of 30 to 40 acres. There are six men, called primers, in the field pulling the leaves, which they place in a box on runners called a "boat" drawn by a horse between the rows of plants. Another man takes the filled boat to a table where the women "tiers" tie the leaves to long laths which are carried on a moving belt into the kiln where two men stack them on racks. When the kiln is full it is closed up tightly and oil burners are turned on. The temperature at the start of the curing process is about ten degrees higher than the outdoor temperature, and increased gradually to about 170 degrees fahrenheit.

Because this tobacco was originally cured by currents of warm air from pipes joined together at the back of the kiln to a chimney or flue, it is called "flue-cured". A different process is used with burley tobacco, which is usually air-cured without the use of artificial heat.

"Flue-curing is a very exact and delicate operation," says E. K. Walker of the Department of Agriculture's tobacco substation at Delhi. "Many a fine leaf has been ruined by carelessness or ignorance in the curing kiln."

The most frequent mistake is haste. The leaves should be given just enough heat, combined with a satisfactory amount of humidity, to produce a delicate yellowing throughout all the leaves. This requires

TOBACCO: ANOTHER CANADIAN ACHIEVEMENT

constant supervision, frequent adjustments of temperature, and a considerable amount of judgment and experience. After the leaves have been yellowed, usually by the end of the first day, the heat is turned up gradually and carefully to dry them out. The whole process takes about five days, at which stage the leaf is brittle and cannot be handled until it is steamed to a soft, pliable consistency.

Some growers look after their own curing, but many feel reluctant to take the chance of ruining a season's growing by a few days of mishandling; therefore, they hire expert curers who usually come from the United States. These men earn up to \$25 a day, plus room and board, and transportation to and from their homes. Because a curer can do a better job when he is familiar with the nature of the leaf he is handling, the growers try to get the same men back year after year. Meanwhile, Canadian tobacco men are becoming more knowledgeable about the secrets of curing, and more of them are being employed in that way every year.

When the tobacco is cured, it is transferred to a dry barn for storage and the kiln is ready

for another load. The usual practise is for the field workers to fill one kiln a day, which takes from about eight o'clock in the morning until four in the afternoon. If at any time all the kilns are full, or there are no leaves ready for pulling, the field crew can be put to "suckering" — which means breaking off the subsidiary shoots that grow from the main stalk of the plant, drain it of strength and delay maturity.

Before the second World War, unemployed persons from far and near used to crowd into the tobacco counties looking for work. The usual result was that many of them became stranded, without work or money, and got into trouble. Since the war the National Employment Service has helped to secure, in an orderly manner, the extra help that is needed.

"We ask the growers to tell us how many workers they will need and when they will need them," says E. G. Yundt of the Simcoe office of the National Employment Service, "and we try to provide experienced men and women on the day they are needed so that no one is left hanging around idle."

Women workers tie the tobacco leaves on to laths which are run up into the kiln and hung on racks during curing.

T. I. Silverthorne





In the kiln, the tobacco leaves are warmed by heat from flues until they turn bright yellow.

Imperial Tobacco

The importance of experience is not always appreciated. The field workers should not only know a little bit about tobacco, but should also realize that working under a hot sun all day can be very tiring for those who are not used to it. Also, the stooped position in which the primers work, starting with the

bottom leaves and working up the stem a few leaves at a time, takes a lot of getting used to.

Most of the migrant workers arrive in groups, four or five friends or a whole family together. Many drive cars (more or less battered), a few boast trailers, more have tents, and a great many sleep in the open during the fine nights which prevail at this season in the tobacco country. They cook their meals in the open, sometimes "scrounging" corn and other edibles from the surrounding fields, until they start work. After they start work the grower usually feeds them.

Some of the migrants spend their money as rapidly as they get it, winding up their six weeks in the tobacco fields with a monumental binge. Much more common, however, are the migrants with a mission, intent upon bringing home a nest egg as large and as valuable as possible. Many are students who use the money to pay for their education. Many of the family groups are in the tobacco fields to earn enough money to make a down payment on a home. A few are working feverishly to pay off accumulated debts.

In spite of the combined efforts of the growers and the National Employment Serv-



Sorting and grading cured tobacco leaves ready for market.

Imperial Tobacco

TOBACCO: ANOTHER CANADIAN ACHIEVEMENT

ice there are always a number of people who gather in the tobacco country at harvest time but who never get work because they are totally inexperienced and unsuited to field labour. At the same time, there are never quite enough experienced hands to meet the demand. This was particularly so last year, when the shortage of labour caused the harvesting operations to lag about a week behind schedule, leaving millions of pounds of tobacco still in the fields to be destroyed by the frost which struck on September 15th.

The growers try every year to have the harvest completed by September 15th. This does not mean that their work is over for the year on that date. After all the tobacco is cured, the gold-coloured leaves have to be sorted, graded and packed in bales, which requires an experienced eye and careful handling. A report has to be made to the Marketing Board, which conducts auctions at Tillsonburg, Delhi and Aylmer. The grower is responsible for storing his crop until the buyer takes delivery, which may not be until February or March.

Meanwhile, the grower keeps busy. He has

invested a considerable amount of money in his greenhouse, barns and kilns, his heating and irrigating systems, his planting and cultivating machinery. Winter is his best time for looking after this property, for painting, repairing and improving. Before he knows it, April has come around again and another season has begun.

Tobacco is important not only to the grower, his workers and the local communities, but to all Canada. Forty-eight factories in Canada employ more than 10,000 workers who turn this home-grown leaf into cigarettes, cigars, pipe and chewing tobacco, snuff and other goods annually worth almost \$200,000,000. Last year this industry paid out \$37,000,000 in wages and gave the Dominion treasury \$370,000,000 — nearly one-tenth of all the taxes collected by Ottawa.

In addition, Canadian tobacco earned some \$25,000,000 in overseas markets last year, the biggest buyer by far being the United Kingdom.

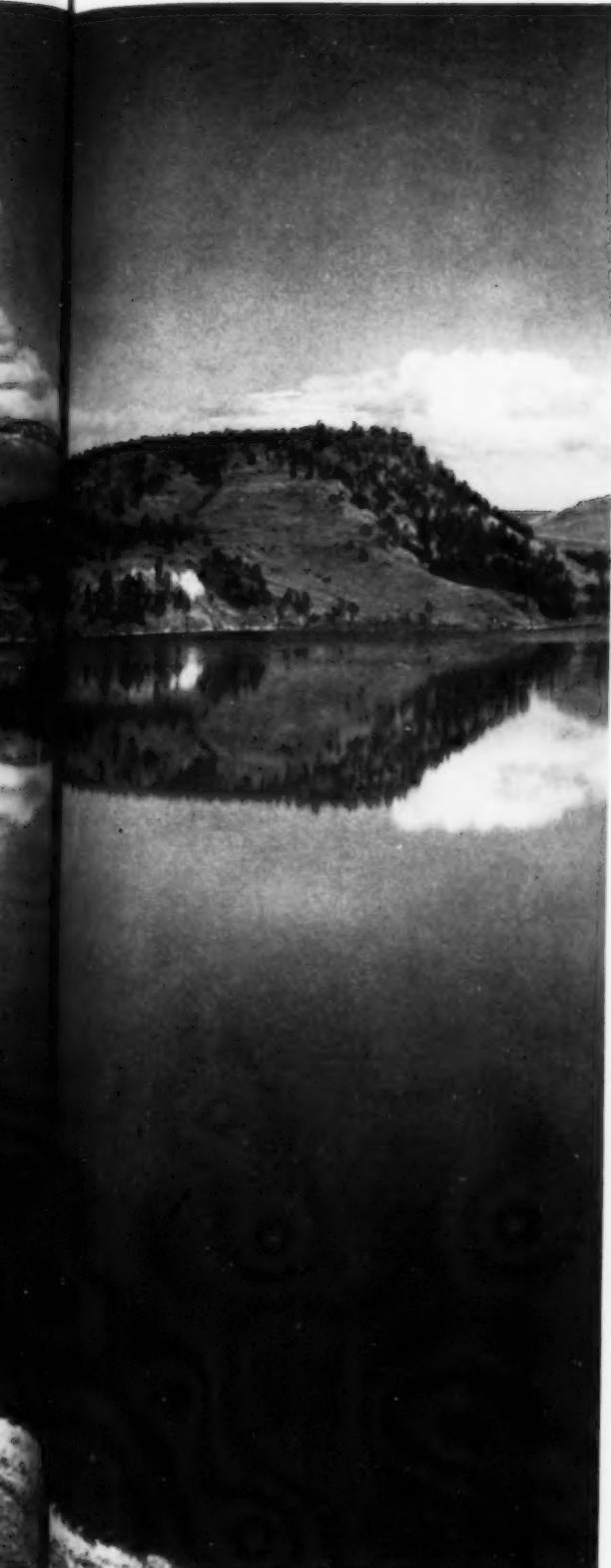
This is a remarkable record for a weed that was barely recognized in Canada a mere 30 years ago.

A group of migrant workers take over an abandoned farm site near Delhi, Ontario, sleeping in cars, tents, and makeshift shelters.

T. I. Silverthorne







British Columbia Lakes

Photographs by DONOVAN CLEMSON

An Okanagan Valley gem is Kalamalka Lake seen here during calm spring weather. The lake lies in a basin surrounded by almost bare hills and is noted for the varying colours of the water.



Griffin Lake in Eagle Valley on the main line of the C.P.R. where it emerges from the Selkirks, is typical of the small mountain lakes beloved of anglers and campers.

The Arrow Lakes are a widening on the Columbia River's southward course. The water is cold and green. The scene is of the Nakusp launch club wharf on Upper Arrow Lake. The smoke of many sawmills obscures the opposite mountains.

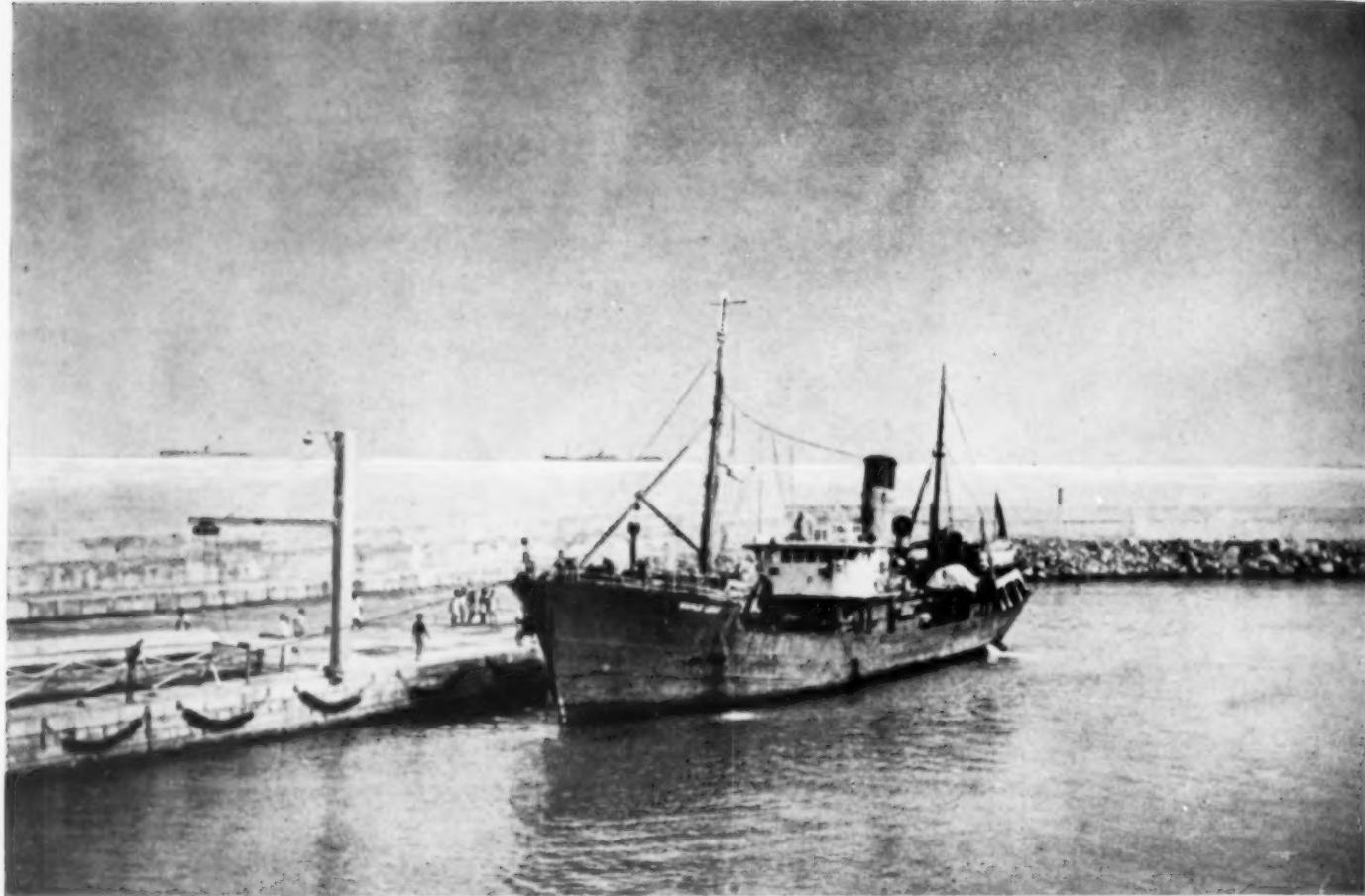




Shuswap Lake's long, narrow arms occupy several deep valleys. The lake feeds an important tributary of the Fraser River, the South Thompson River. The early morning photograph shows the drifting smoke from sawmill burners spreading over Salmon Arm.



Okanagan Lake 136 square miles in area but is fed only by small creeks. The water level varies very little so that trees often overhang the lake. The scene is near the northern end of the lake.



The fishing trawler "Maple Leaf" supplied by Canada to Ceylon. A second fishing trawler, the "Bracongen," was supplied by the United Kingdom.

How Canada is Helping the Fishermen of Ceylon

by C. E. CHAPLIN

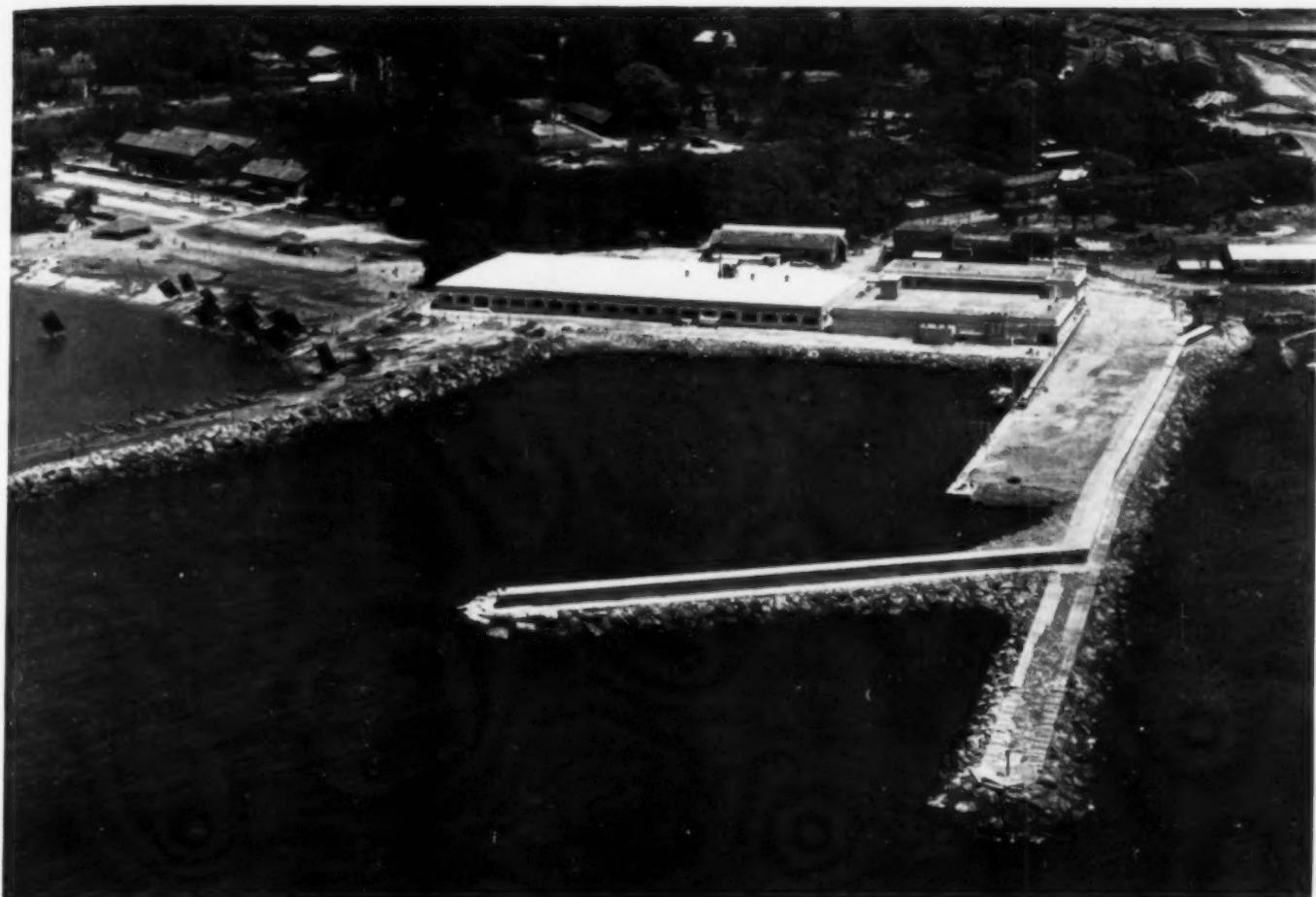
Photographs by the author except where credited.

THREE WAS a time when, it is said, one wealthy Asian wishing to embarrass another might make him a gift of a white elephant. Being sacred and large, this animal required special treatment and could not easily be disposed of again. That the gift, to all outward appearances, was made with the best intentions and utmost generosity did nothing to lessen the cost of upkeep. The new owner could do nothing but endure his good fortune. Critics of foreign aid programmes regard our projects in Asia as the legendary white elephant up-to-date and, they claim, much of what we build will become burdensome possessions once our support and direction are withdrawn. If there is any reason for this attitude, we must evaluate our work carefully.

The Colombo Plan provides for a system of mutual assistance. Originally it was planned among Commonwealth countries but later it included Asian countries and the United States as well. Its influence is widely felt. At the tenth annual conference of the Consultative Committee held in Indonesia in 1959, the co-operating countries extended its operation a further five years.

The Project

The Canadian Fisheries Project in Ceylon is a good example of the effect of foreign aid on an entire industry. When this project was initiated, Canada undertook not only to develop the industry but also to help improve the lot of the fishermen. In the beginning, therefore, it was understood that economic



Aerial view of the Colombo fisheries harbour with the by-products plant centre, and cold storage plant adjoining it to the right. The jetty shelters the harbour from the south-west monsoon. Outrigger canoes of the old village are seen to the left.

Department of External Affairs

advance alone was inadequate without social development at the same time. From the time in 1951 when the planning of the project began, interest in the fishermen's welfare has been maintained. This project, involving a Canadian expenditure of about \$3,000,000 and the work of nearly 30 Canadians in Ceylon, is the largest single foreign aid project in that country.

The Adviser

The Colombo Plan worker is an unofficial ambassador of his country partly because he is sent on the recommendation of his country and partly because people everywhere are apt to generalize about a country on the basis of a few acquaintances. The Canadian is fortunate in Asia, where few compatriots have preceded him and Canada is largely unknown. It is, therefore, up to him to create a favourable impression of Canada and of himself in an environment where there is no adverse opinion. A genuine liking for people and an interest in their problems create the confidence that is essential to do the job.

These attributes together with a recognized technical competence become extremely important in the unsophisticated communities of Ceylon's coast.

The Need

Ceylon is a small island with a history of fishing that goes back to earliest times. Its population, estimated at perhaps 20 million at its peak, had shrunk to about one million at the beginning of the British administration early in the nineteenth century. It is now approaching nine million and is increasing at the rate of a quarter of a million a year. The problem of providing food is becoming acute. The fishermen, who number about 40,000, supply about 40 per cent of the country's fish requirements. Scarce foreign funds must, therefore, be found to purchase 60 per cent abroad. It was hoped that, with improved methods of fishing and an increased knowledge of the island's waters, the fishermen would be able to raise their contribution considerably.

Without noticeable exception the fishing gear and the craft of Ceylon have not changed



The fishing fleet returns to Negombo on the afternoon wind.



Shown here is the old method of hauling the catch which requires too much for the s

for centuries. The dug-out canoe, or "oru" on the Sinhalese coast and "vallam" among the Tamils of the north and east, is graceful and picturesque. It rides well in a following wind but is helpless in any other. The distance between the gunwales being the width of a man's thigh it has poor carrying capacity. *Orus*, handlines with single hooks, drift nets, beach seines — none of these is adequate today.

The Ceylonese fisherman has traditionally navigated by sight. The island shelf is nowhere more than twelve miles wide but sight navigation is possible in only rare instances at distances greater than five miles from land. The limitations of this navigational method combined with dependence on the wind have denied access to at least half of the potential

fishing grounds. Clearly, there was opportunity for helping the fisherman; to modernize his boats, his gear and his methods in the effort to increase production.

The rest of the industry was equally primitive. Transportation and marketing were controlled by a small group of dealers and, as a result, local gluts coincided with serious shortages. Preoccupation with the Colombo market caused a permanent fish shortage inland. Seasonal variation in catch and lack of storage facilities enriched those who controlled the supplies. These operators could dictate terms to both the fisherman and the consumer. In this phase of the industry help was required in applying techniques for handling, processing, distributing and marketing.

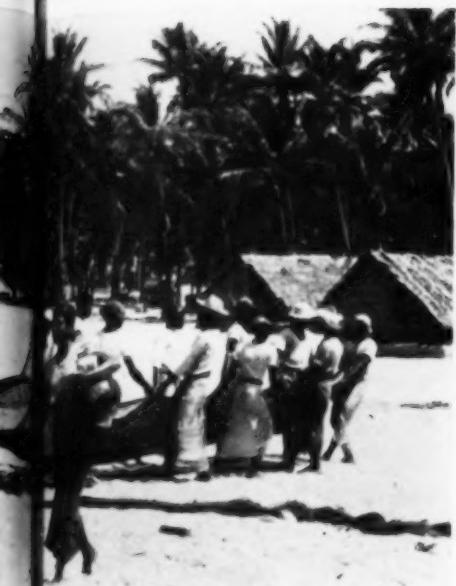
Canadian help was concentrated first on

Tamil women with pestles and mortar grind roots for dyes to colour their coir nets.



Taking the fish to market





*f has the catch by means of a beach seine,
much for the size of the catch.*



A west coast fishing village. The coconut plantation provides all the building material needed—lumber, thatch and fibre.

fish processing; to this end Ceylon and Canada co-operated to build a fisheries harbour and a fish processing plant. The plant is used for freezing, for storage and for unfrozen storage for short periods. Two trawlers, one given by Canada, the other by the United Kingdom, unload their catch at a jetty beside the plant after fishing the Wedge Bank 150 miles away off India's southernmost point. The plant can also produce more than twenty tons of ice a day for use in packing fish for road transport or aboard the trawlers. Shark liver oil is extracted for use in supplementary vitamin feeding. There are also means to produce dried fish, canned fish and fish meal.

The plant has had a noticeable effect on the market price which is not now subject to

the extreme fall that used to coincide with the arrival or the rumour of arrival of a shipment of fish in Colombo. Nor do prices climb to the same extent with seasonal scarcity. More people can now buy good fish for a greater part of the year.

Insulated trucks, also provided by Canada, are now used successfully for long-distance transport, bringing fish on ice to Colombo for storage or inland for sale. Although this practice is worthwhile, shippers and dealers have still to be convinced of its value.

The Fisherman

In recounting help to Ceylon's fishermen it was necessary to give attention to this short account of aid to the industry in general. The fisherman benefits from the

the fish to market.

The old method of marketing the fishing catch. A peddler displays his goods outside the Colombo wholesale market.





Dr. C. E. Chaplin lecturing Tamil instructors-in-training at Trincomalee.

operation of the plant and the more efficient distribution. This indirect help can give him a greater reward for what he catches.

Work among the fishermen is interesting and congenial because it is more rewarding. Luckily it is here we can do the most good for Ceylon and for Canada's prestige.

Establishment of schools in fishing centres to teach co-operative methods was a most important development, which gave us contact with 40,000 fishermen. Schools were started in Jaffna and Galle on the north and south coasts respectively, and in Negombo and Batticaloa midway on the west and east coasts respectively. The co-operative method of Antigonish is used: help them to help themselves. It begins with the definition of a problem, then an analysis in which the problem is divided into three parts: first, what the fishermen can do by themselves; second, what requires outside help; and, third, what must be done entirely from outside. They are then encouraged to do what they can and plan for what requires help.

This approach, obvious to do-it-yourself-minded Canadians, was revolutionary in a community controlled for centuries by the money-lender. These fisherfolk had never undertaken any action without the pressure of their village leaders, they had never undertaken concerted action of any kind, and they had never really considered the possibility of bettering themselves. The cultural pressures of rigid social strata and fatalistic religious philosophies do much to discourage the struggle for economic security. Moreover, the co-operative movement in Ceylon had had a history that left much to be desired. Local co-operatives generally had been organized



The "oru" is graceful and suitable for beaching where there are no harbours.

A class of aspiring co-operative managers and secretaries at the Negombo training school.



to establish credit and obtain government loans and the novelty of co-operating in work was regarded with suspicion. However, with perseverance the local groups gradually gained momentum and today some are models of their kind.

The Results

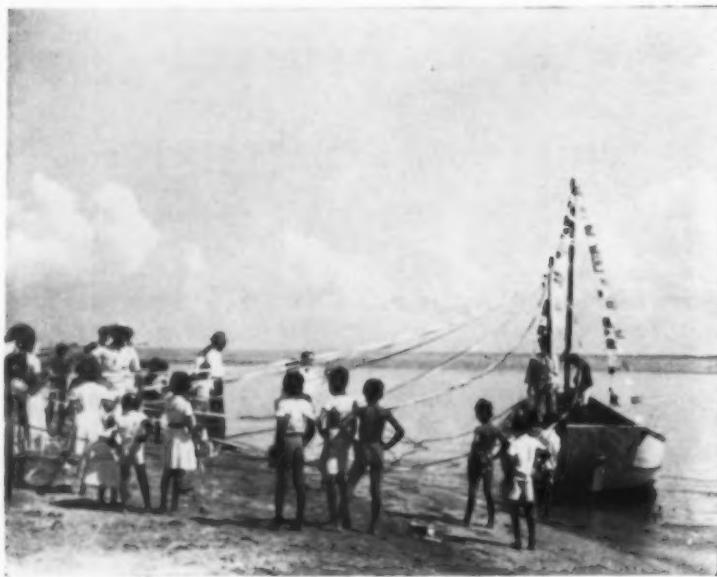
When the co-operative training was underway in the schools and in village discussion groups, classes in modern fishing methods were introduced by specially trained instructors. Groups now coming to the schools for co-operative training may attend technical classes during the same visit. The schools are so valuable that more are being opened by the Ceylon Department of Fisheries. The instructors do not restrict their activities to the class rooms; they live in the villages and work in the boats.

The training of the instructors was the crucial experiment of the whole scheme. Credit must be given to Mr. D. T. E. A. de Fonseka, Director of Fisheries, who could see the value of the plan and gave it his complete support. The officers selected had been inspectors of the fisheries department and, in their role of enforcement officers, were the natural enemies of the fishermen. They were chosen because of their record, which, in all cases, had shown sympathetic interest in the plight of the fishing community. When they reported for training none had ever held any

but a white-collar position — with all the prestige that goes with such a job. First they were told that if they wished to teach they would have to take training in the performance of all the tasks aboard a modern fishing boat — rigging gear, cutting bait, cleaning fish, washing up and navigating — but



Shaping the stem of an "oru" is skilled work.



Launching the first powered Ceylon-built fishing boat at Pitipane.

and pass on news to others. A newsletter was started to bring up-to-date information to fishermen and their teachers, but its real value was in demonstrating to those in isolated spots that they were not forgotten. The letter was a surprising success and was soon in demand in many countries. It turned out to be the first of its kind, the first to be aimed at such a public. The most heartening fact about the newsletter is its continuing existence eighteen months after Canadian direction of it was ended.

The newsletter carries an editorial to introduce a new instructor or discuss an issue of interest. It also contains technical tips about new methods or gear and quotes Colombo market prices. From it can be seen that by mid-1959 locally built, mechanized fishing boats totalled 165. This figure is perhaps, in itself, not impressive, but the first boat of its kind built in Ceylon was launched only fifteen months previously.

The suddenness of this development suggests that there is more to it than appears on the surface. The sequence of events went something like this. The Food and Agriculture Organization of the United Nations had sent a marine engineer to assist in a programme of small-boat mechanization. This work advanced slowly because the dug-out canoes do not lend themselves readily to this form of modernization. Canada supplied 40 engines to establish a revolving fund and at the same time longlining was introduced by the Canadian instructors. Then a local partnership produced their prototype craft capable of handling 1000-hook longlines. When gear, method and craft were right the time was ripe to move to this type of fishing.

The first powered craft in its first thirty days of fishing landed a catch worth the cost of the boat. Since that time several boat-builders have entered the business of trying to build boats fast enough to supply the eager buyers.

People everywhere are unwilling to change age-old work habits without very good reason. When the reason is there, reports like this of November 1959 can be expected: "Our extension officer at Trincomalee reports that



A catch of 'seer' and 'paraw' aboard the former Canadian dragger "North Star."

HOW CANADA IS HELPING THE FISHERMEN OF CEYLON

after much persuasion he has succeeded in getting three of the fourteen mechanized *vallams* in Division No. 10 Trincomalee to take up floating longline fishing. This method proved so successful during the month of October that the others have also adopted the same method of fishing." Their catch was marlin, tuna, sailfish and shark.

It is easy to see the changes. They are sudden and dramatic. But there is a much more profound change that cannot be seen. These fishermen have opened their minds to new ideas and we have been able to help.

The Canadians who served in Ceylon have learned as well as taught. Most of them were in Asia for the first time and have found that an alien culture can be interesting. They have learned, sometimes with astonishment, that civilization without gadgets is possible and

that an unfamiliar scale of values can be valid in an appropriate environment. They have learned that, though Canadian methods may be right for Canada, they are not necessarily most apt in an exotic setting. Some have learned to like the moderate pace of the tropics and all have learned to like the people.

Although Canada's material gifts to Ceylon's fisheries have been considerable, the intangible benefits might well be of greater ultimate value. We provided schools but we also left behind a system of training that emphasizes self help. If this method of training becomes a habit, and it promises to, we shall have helped make it possible for these fishermen to jump centuries in technological time. As long as it lasts Canadians and their generosity will be remembered.

The first catch of sharks using new methods at a village of the east coast of Ceylon. This catch did much to reduce the age-old debts of the villagers. For this great occasion the strictly secluded Muslim women ventured outside to view the catch and the celebrations that took place.





The Pacific coast of Moresby Island south of Tasu Sound is precipitous and forbidding because it is a fault line scarp. These steep slopes continue beneath the sea to the ocean floor, 10,000 feet deep.

Physiography of the Queen Charlotte Islands*

by A. SUTHERLAND BROWN

Photographs by the author except where credited.

FEW REGIONS in Canada are as intriguing as the Queen Charlotte Islands of British Columbia. The casual visitor feels their uniqueness without knowing why. The feeling is engendered by a sense of their remoteness and any knowledge of Haida legend or the character of the islands and their people only heightens the feeling. Familiarity with the islands means acquaintance with a wide variety of country: flat lands and sculptured mountains, primeval rain forest and open muskeg, forbidding sea cliffs and quiet fiords, wide shelving beaches and exposed rocky islets. Familiarity with the islands also means acquaintance with a unique climate, mild but storm wracked. Greater acquaintance or more specialized knowledge leads invariably to greater intrigue. Hence scientists of many professions find the

islands among the most interesting and perplexing areas of Canada. The sources of their interest are as varied as their fields of study; however the ultimate reason is commonly related to the remoteness of the islands and their position on the brink of the continent.

This article deals only with aspects of the Queen Charlotte Islands related to earth sciences: topography, geology, glaciology, seismology which together could be encompassed in the larger meaning of physiography. The islands are challenging to the earth scientist not only because of the difficulty of carrying on field investigations but also because of the perplexing problems which they present.

The Queen Charlotte Islands lie between 52 degrees and 54 degrees north latitude and 131 degrees and 133 degrees west longitude.

*With permission of the Chief of the Mineralogical Branch, British Columbia Department of Mines.



A geologist taking a dip needle observation overlooking Buck Channel, a west coast fiord. Low clouds and rain are typical of summer weather.

In plan the islands form a scimitar-shaped group, convex to the Pacific and handle toward the south (see Fig. 1). Graham Island, the largest, forms the broad northern part of the blade whereas Moresby and the lesser islands, Louise, Lyell, Burnaby, and Kunghit, form its tapering southern part.

The islands are at the very edge of the continental shelf. The slope that forms the western ranges of the islands continues beneath the ocean to abyssal depths. This slope rises from the ocean floor 10,000 feet deep to sea level and continues another 4,000 feet to the high peaks. The slope however is not a simple tilted plane but is cut by a series of sharp ridges and troughs parallel to the western shore of the islands. This submarine topography has great significance and is discussed later. The eastern side of the islands slopes gently to the shallow basin of Hecate Strait which separates the islands by 30 to 80 miles from the mainland. Most of this basin is only 50 to 300 feet deep. Figure 4 shows all these relations in a cross-section from the ocean bottom across the islands and Hecate Strait to the mainland.

Figure 1. The Queen Charlotte Islands showing physiographic boundaries.



The islands are divided into three regions of differing topography and these correspond fairly closely with belts of differing geology. These regions trend parallel to the west coast of Moresby Island and so cut obliquely across the curving blade of Graham Island. The western region comprises the Queen Charlotte Ranges, the central region is the Skidegate Plateau, and the eastern region is the Queen Charlotte Lowland (*see Fig. 1*). The Queen Charlotte Ranges are the old backbone of the islands and they have been the source of much of the sediment that forms the rocks of the other regions. The ranges have been rejuvenated in the recent geologic past and now stand as rugged dissected mountains 3,000 to 4,000 feet high. They are more impressive than this modest altitude would suggest because of their steep slopes and great degree of dissection. Toward the north and south along the mountain axis the summit heights decrease but the mountains scarcely lose their ruggedness before they disappear below the sea. Intense wave attack on the exposed storm-bound coast of Kunghit Island and Cape St. James increases the illusion that the mountains plunge beneath the sea without decrease in dissection. The same intense marine erosion

increases the slopes on the west coast and heightens their forbidding character. With the exception of the few sheltered coves and inlets there are no beaches on this coast as the materials eroded by the wave attack are carried into deep water. On the east coast of Moresby Island the mountains are less formidable and wave-cut benches and beaches occur. The mountains strike inland from Louise Island and northward the coast takes on a different aspect.

The Skidegate Plateau is a partially dissected peneplain, or old erosion surface, that slopes northeastward from the mountains toward the Hecate depression. The western boundary extends from Louise Island to Rennell Sound and the eastern from south of Sandspit to near Langara Island. Concordant table-topped hills and flat ridges slope gently from about 2,000 feet in the southwest to 500 feet or so on the northeast. The upland remnants are separated by relatively steep slopes and by valleys of variable width. The plateau surface is a complex one represented in part by an old erosion surface and in part by flat lying lavas that have been poured out on that surface. Almost all the Skidegate Plateau is underlain by rocks younger than those of the Queen

The east coast of Moresby Island has subdued mountains and abundant islands compared to the west coast. Skincuttle Inlet separates Burnaby Island in the background from Moresby Island. Iron ore deposits are being explored at Harriet Harbour in the foreground.





Rock benches cut by wave attack are common on the exposed east coast of Moresby Island. These ones near Lyell Island are cut in folded Triassic limy shales and have been raised slightly by earth movements.

Charlotte Ranges; the peneplain proper mostly by Cretaceous rocks and the rest of the plateau by Tertiary lavas.

The Queen Charlotte Lowlands flank the plateau on the northeast and are areas of low relief, mostly muskeg-covered plains with occasional hills up to 500 feet. They are underlain by flat or gently dipping Tertiary marine shales and sandstones, the low hills commonly being remnants of volcanic flows. Actually, the lowlands are properly part of the floor of Hecate Strait, raised slightly above present day sea level, and are mantled with unconsolidated glacial sands and silt. Reworking of these deposits has provided one great beach along the whole of the shallow shoreline from Skidegate Inlet to Masset. Prevailing southeast gales are eroding the east coast shore and driving the sands northward along the coast to build Rose Spit farther and farther into Dixon Entrance. The main process on the north coast is deposition — caused in part by sand that is blown across the spit in dunes.

Glaciology

The glacial history of the Queen Charlotte Islands is a controversial subject. A current theory among biologists assumes that considerable areas of the islands were ice-free

during maximum glaciation thus providing "refugiums" that can explain a number of anomalous species distributions. These anomalies consist mostly of species or sub-species of plants and animals that are found only on the islands. They include such diverse things as a unique caribou, a hairy woodpecker, a sand hopper, and a saxifrage. Many biologists believe that these represent a pre-glacial or inter-glacial residual flora and fauna because they do not think enough time has elapsed since the end of the last glaciation for the necessary differences to develop so that new species would be created. In contrast, geologists believe the whole area was glaciated and that some other explanation must be found for the anomalous populations.

The general form of the topography was fixed before the Pleistocene glaciation but that glaciation has modelled the rough mass into the form we know at the present time. Evidence of glaciation is everywhere.

In all sheltered waters shaping, grooving, and polishing are evident on hard rock. In places such as the entrance to Tasu Sound this shaping can be seen on bare slopes for 2,000 feet elevation. Erratic boulders over 6 feet in diameter have been found on tops of ridges at 1,200 feet elevation on the eastern

part of the range. Glacial till is evident on many others. Catenary valleys, hanging valleys, and cirques are everywhere. Some of the cirques have their floors below current sea level showing that the permanent snow line when they were formed was likewise below present sea level. During maximum glaciation sea level was 200 to 300 feet lower and most of Hecate Strait would have been exposed were it not covered by ice. The only

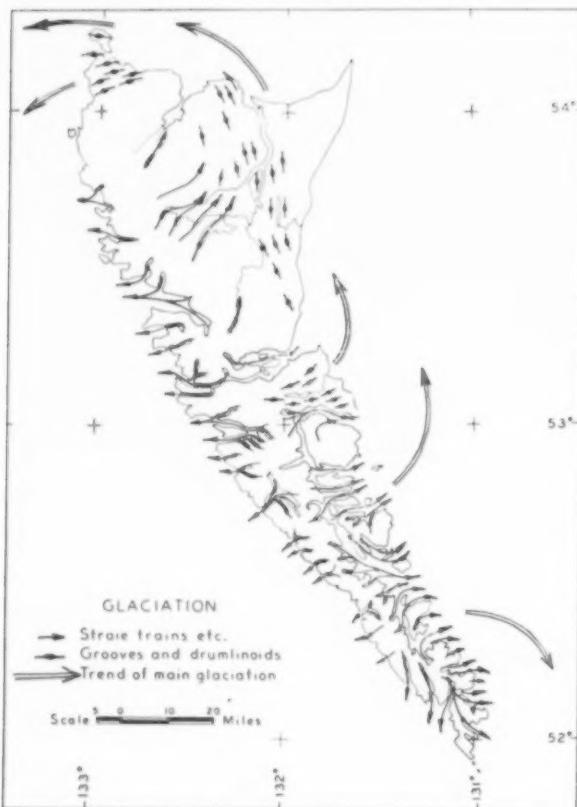


Figure 2. Glacial Trends.

possible ice-free areas in the islands may have been the highest peaks that may have projected above the icefield surface as nunataks.

Figure 2 shows the trends of glaciation from striae and from drumlinoid features on the plateau and lowland surface. These trends show that ice from the Queen Charlotte Islands swept well out into Hecate Strait where it must have impinged on and merged with a north-flowing mass from the Coast Mountains which wheeled out of Dixon Entrance to calf as icebergs from a great ice shelf near the continental slope.

Geology

The Queen Charlotte Islands have had a long and violent volcanic record. Figure 3 is a generalized map showing the present distribution of rocks. The earliest rocks known are pre-Upper Triassic (older than 200 million years). These are altered basic volcanic rocks many thousands of feet thick. The end of the Triassic period was relatively quiet with the accumulation of several thousands of feet of grey and black limestone and limy mud containing many invertebrate fossils. The Jurassic period began with folding, uplift, and erosion of these earlier rocks and on them were laid a group of conglomerates, sandstones, and shales. This was followed by violent and varied volcanic activity that lasted throughout most of the Jurassic. Extrusion of great sheets of pillow lavas alternated with a thick accumulation of explosive products, forming agglomerates, breccias, and tuffs. In one area more acidic rocks than normal occur as welded tuffs and agglomerates, products of Pelean type "glowing cloud" eruptions. These eruptions are caused by an explosive frothing of viscous incandescent lava from either craters or fissures. The emission is supported by a cushion of hot gases and can travel down slopes at very high speeds. When it eventually settles the pumice, ash, and blocks are hot enough to weld together into a compact lava-like rock. A famous recent example of this type of volcanism occurred in the Valley of Ten Thousand Smokes in Alaska in 1912 from fissures near Katmai Volcano. In the Queen Charlotte Islands, when the outpourings of all types were finished, a thickness of more than 10,000 feet of rock had been deposited. All the foregoing types have had to be grouped together on the generalized geological map, Figure 3. It can be seen that they are the primary rocks of the Queen Charlotte Ranges. The other rocks within the mountains are mostly granitic rocks resulting from the intrusion of large deep-seated masses known as batholiths. These were chiefly emplaced at the beginning of the Cretaceous period.

Towards the end of the Lower Cretaceous period (100 million years ago) the Queen Charlotte Islands may have crudely resembled



The north coast beaches of Graham Island are being built further and further out into Dixon Entrance. This view is characteristic of 80 miles of beach from Tlell to Masset but is actually looking west from Rose Spit to Tow Hill which is shown at top of next page.

H. Nasmyth

the islands today. There was a highland in the west and a low swampy coast to the east much as there is at present. The sea level fluctuated and deposits alternated between conglomerate, sandstone, and shale, and coal which accumulated in the brackish swamps. In turn this deposition came to an end by folding and erosion that led to the formation of the Skidegate Plateau surface. Before this peneplain was uplifted, Miocene marine sands and shale (about 20 million years old) were deposited and these were covered by great floods of thin basalt flows. The uplift, faulting, and local mild folding of the Miocene rocks were the last events before the onset of the Pleistocene glaciation. Figure 3 shows that the Skidegate Plateau is primarily underlain by Cretaceous sedimentary and Tertiary rocks whereas the Queen Charlotte Lowlands are almost entirely underlain by Tertiary rocks.

Structure and Seismicity

Faulting has been a process active throughout the geological record. Great transverse shears that cut the island into slices are shown on Figure 3. These shears have been active probably during all the latter part of

the geological history. The current seismic record shows that the islands are by far the most active earthquake area in Canada.

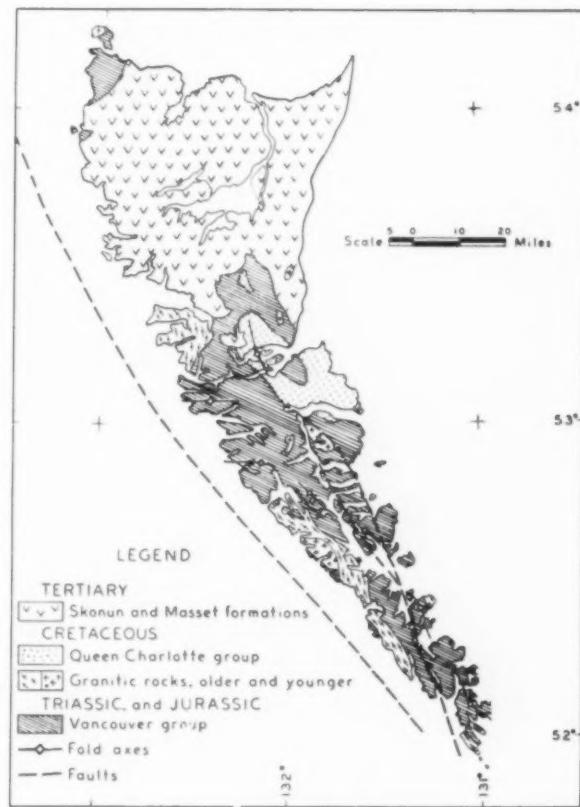


Figure 3. Geological map.



The Queen Charlotte lowlands on northeastern Graham Island are properly part of the floor of Hecate Strait raised slightly above sea level. Tow Hill in the foreground is an erosional remnant of a sill of columnar basalt overlying Tertiary shales exposed on the beach.

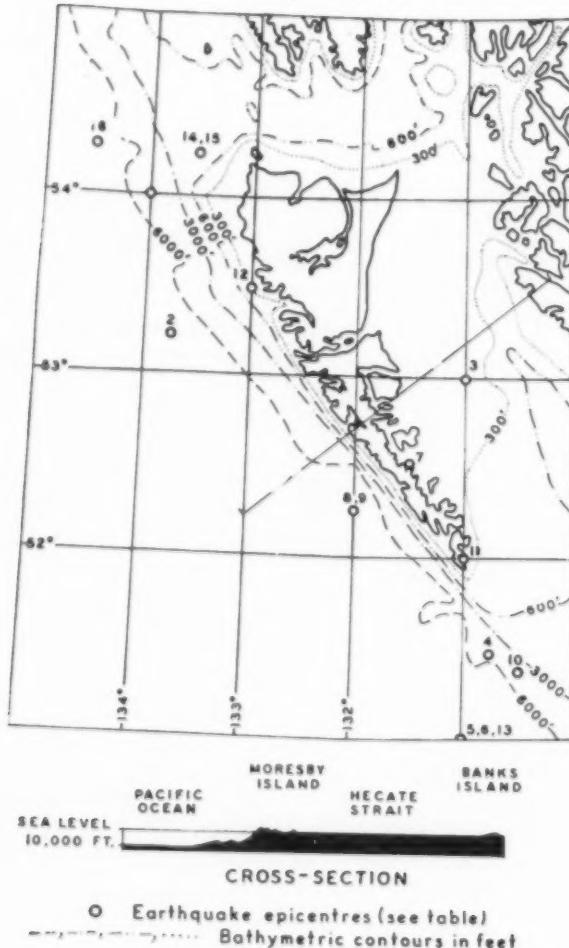
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Figure 4 shows the recorded epicentres of major shocks from 1918 to 1951. The table shows the date and magnitude of these shocks. The 20th August 1949 shock with a magnitude of 8 is among the largest of earthquakes.

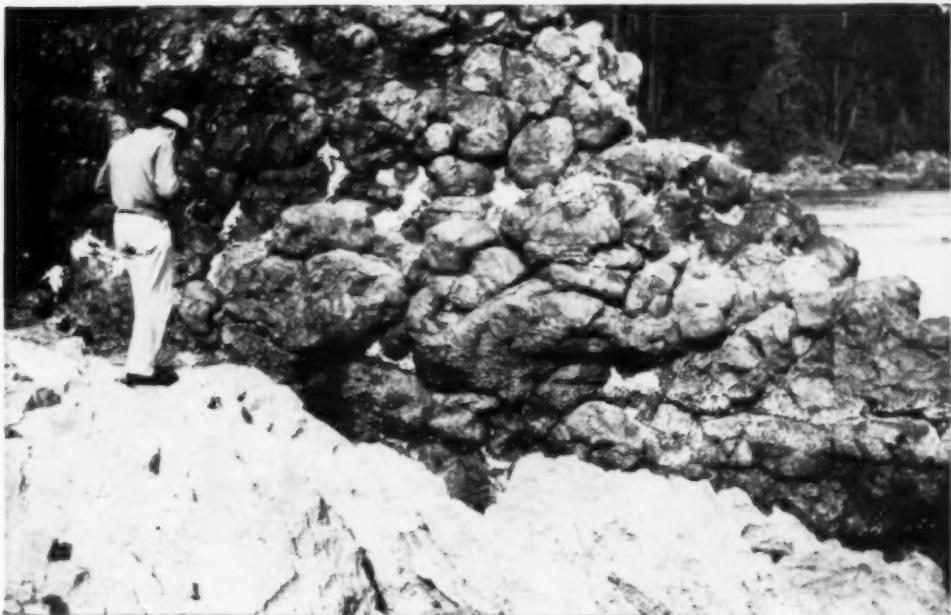
The earthquakes epicentres, or points on

the earth's surface immediately above such shocks, have been determined by instrumental readings accurately enough to indicate that current shocks are related in part to the known shears on the islands. For example, the 21st December 1936 epicentre falls at the intersection of two major shears and the 29th October 1945 epicentre just off the continuation of these shears. There is reason to believe that the shears on the islands are subsidiary to a massive shear zone that follows the west coast of the islands and continues up Chatham Strait to become the Denali fault. The fault off the islands is not observable but it is quite evidently real. The evidence has not all been gathered together but it includes the alignment of major earthquake epicentres just off the coast, the very steep western front of the islands which resembles a fault-line scarp, and the detailed topography of the continental slope with its very marked ridges and valleys parallel with the northwest trending coastline. The Denali

Figure 4. Earthquake epicentres and submarine topography.



The bulk of the Queen Charlotte Islands are underlain by volcanic rocks. These are Triassic pillow lavas overlying limestone on the shore of Louise Island.

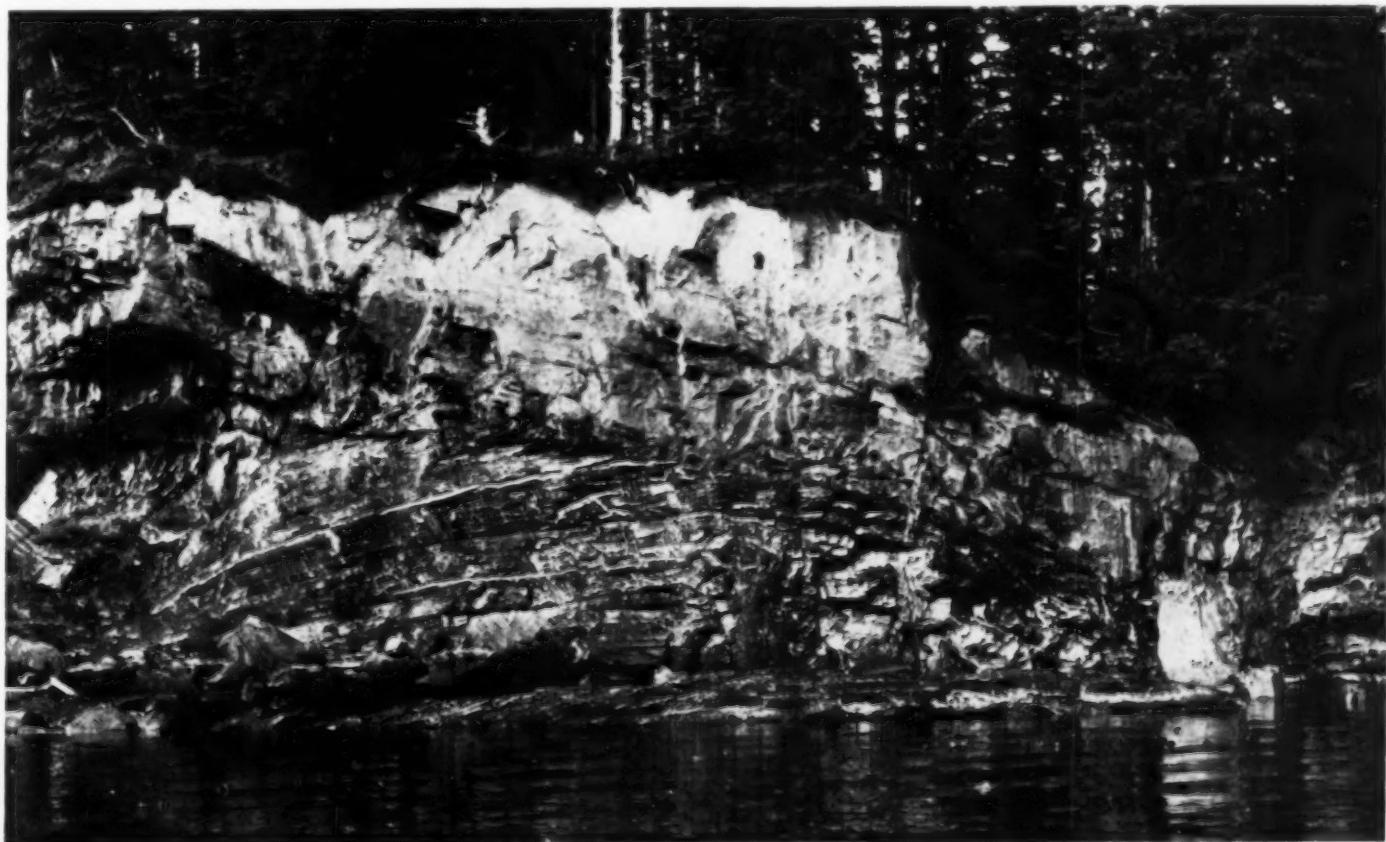


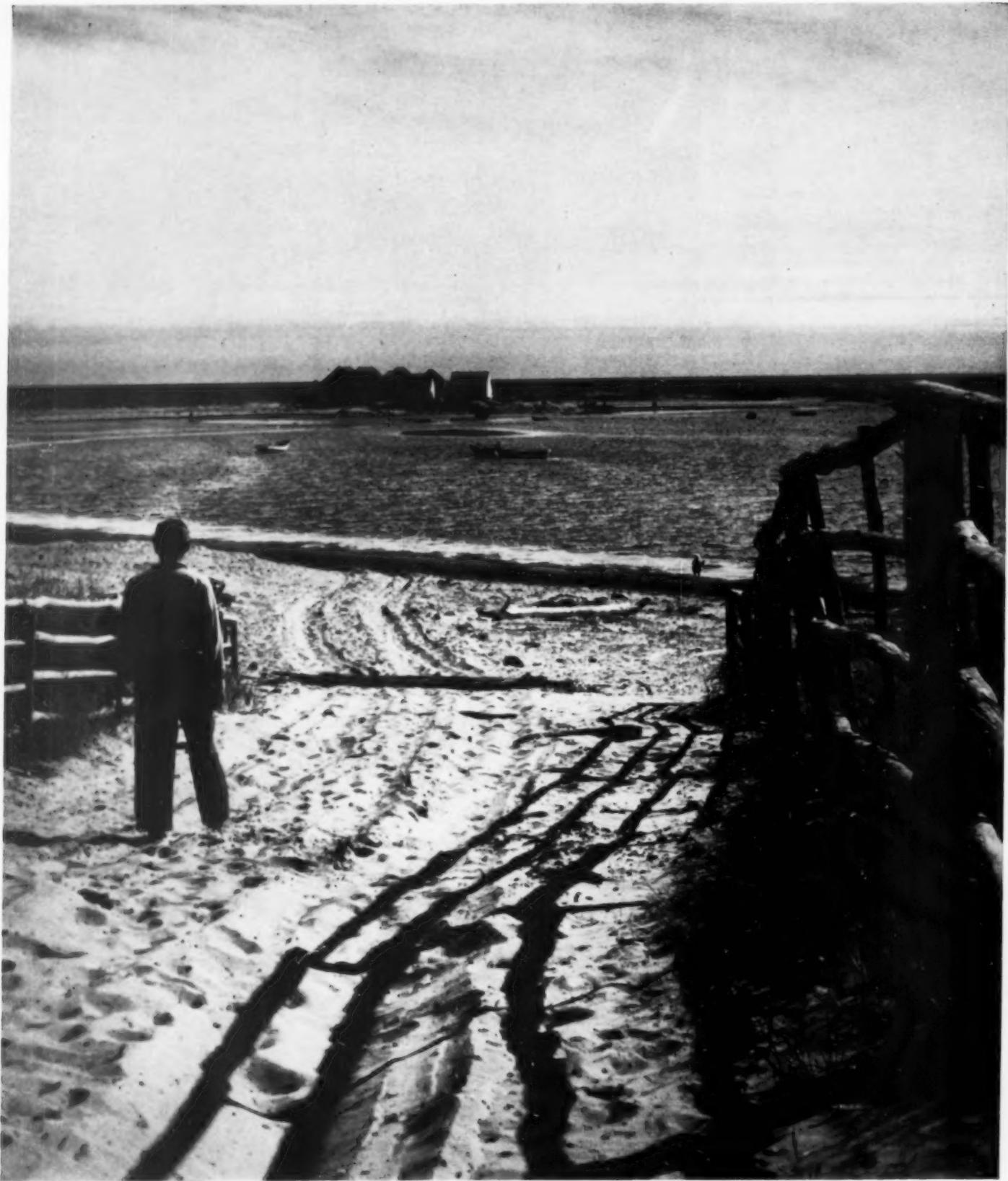
fault is one of the major Circum-Pacific shears and is analogous to the San Andreas fault system of California. For both the San Andreas and the Denali faults it has been suggested that the oceanic side of the faults has moved more than 200 miles north relative to the continental side. If movement of such an order on the Denali fault were restored it would bring the south tip of Baranof Island just west of Rennell Sound and provide the west coast of the Queen Charlotte Islands with a continental shelf. Even if this supposi-

tion is incorrect, the Denali fault along the west coast does explain the anomalously steep continental slope and the extraordinary detailed topography of the slope.

Problems related to the geology, glaciology, and seismology of the Queen Charlotte Islands abound. So far research has been entirely of a reconnaissance nature. It is probable that detailed studies of this critical area will reveal more of the nature and history of the northern Cordillera than would study of any other comparable area.

Earth movements, folding and faulting, have been frequent and at times catastrophic from the Triassic period to the present. Near Burnaby Island is evidence of the first one known, an angular unconformity between folded Triassic limy shales and Jurassic sandstones tilted gently to the right.





Pictures of the Provinces — XXIII

Down a sandy lane, a villager makes his way toward the fish houses erected on a rocky spit of land at Natashquan, on the Quebec North Shore. Five hundred miles beyond Quebec City, this Acadian French village celebrated its centenary in 1955, but few Canadians, other than mining men, know much about it. Geologists found the "black sands" of the nearby river proved to be rich in iron which could be extracted with commercial magnets. This whole land of fishing villages and Arctic-like tundra is gradually opening up today.

Adelaide Leitch



Down the Quebec North Shore, or "Cote Nord", can be found some of the finest canoe builders in Canada. The skilled fingers of Montagnais Indians put their light, graceful craft together without nails or screws, save for a few to hold canvas to gunwales. The floor boards and ribs are hand-carved. Here, at Romaine, a Montagnais canoe-builder puts the finishing touches to a new craft that will last him about four years. The Romaine church is in the background, with the school, left, and a Montagnais tent, right.

Adelaide Leitch

EDITOR'S NOTE-BOOK

Before and After . . .

Before you invest, investigate . . . is just good common sense. And yet, year after year it is amazing how many people . . . good sensible people too . . . fail to do just that.

Buying securities on tips, on rumours, without examination, or buying on the advice of uninformed people, very often causes many an investment headache. Better Business Bureaus are kept busy, Securities Commission officials look into innumerable complaints, and securities are purchased which sometimes turn out to be . . . "not what I thought."

Before you invest, investigation is good common sense. After you invest, investigation is also good common sense. "See your dentist twice a year" is not propaganda . . . it is preventive dentistry. Most people think it good business to check trouble before it starts or, at least, before it becomes serious.

To have your investment adviser check your securities at regular intervals makes sense too. Conditions change, industries change, markets change. To "put them away and forget them" is not good . . . it's not good for teeth, and it's not good for securities. Our organization is equipped to help you investigate *before* you invest and . . . *after* you invest, to help you by regularly checking your securities to see that your funds are working to best advantage and to see that they are doing for you what you want done. Any of our offices or representatives will help you . . . drop in or write, whichever is more convenient.

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Marius Barbeau (*Legend and History in the Oldest Geographical Names of the St. Lawrence*), Fellow of the Royal Society of Canada, studied at Laval University, Quebec, at Oxford University as Rhodes Scholar, and at the Sorbonne in Paris. He was ethnologist and folklorist at the National Museum of Canada from 1911 until recently, and is the author of many books, monographs, articles etc., on Canadian folklore, art, and anthropology. Dr. Barbeau has written articles for the *Canadian Geographical Journal* for many years.

* * *

A. E. (Bert) Surtees (see *Legend and History in the Oldest Geographical Names of the St. Lawrence*) was born and educated in Regina, Saskatchewan. He enlisted in 1934 at age 18 in the Royal Canadian Army Service Corps, in which he has served continuously since then except from 1946 to 1950. His illustrations and cartoons appeared in various Canadian and American Army publications during the second world war.

* * *

Marcus Van Steen (*Tobacco: Another Canadian Achievement*) is a free-lance journalist and writer. He was born in Northern Ireland, came to Canada at an early age, and completed his education in Montreal. He gained experience in journalism with the *Montreal Herald* and *Montreal Standard*, and then became News Editor for the British United Press in Montreal. Mr. Van Steen, after having served in the Canadian Army during the second world war, joined the International Service of the Canadian Broadcasting Corporation as editor and writer. In 1952, he was sent to Halifax, Nova Scotia, as Editor-in-charge, Maritime Region, with the task of setting up a television news room there. In 1957, Mr. Van Steen left the Canadian Broadcasting Corporation to become a free-lance journalist.

* * *

C. E. Chaplin (*How Canada is Helping the Fishermen of Ceylon*) holds



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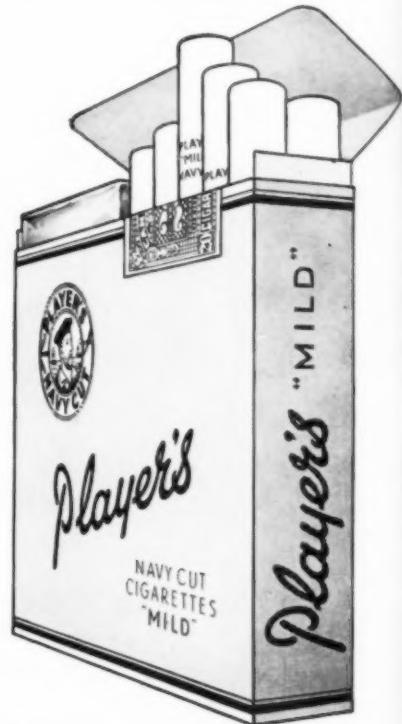
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a Ph.D. degree in bacteriology from McGill University, Montreal. He has been with the Bacteriology Division, Canada Department of Agriculture since 1948, except for two years with the Defence Research Board; he is at present with the Scientific Information Section of the Research Branch of the department. Dr. Chaplin was bacteriologist and Director of the Canadian Colombo Plan Fisheries Project in Ceylon from 1956 to 1958.

* * *

A. Sutherland Brown (*Physiography of the Queen Charlotte Islands*) was born in 1923 in Ottawa, Ontario. After serving with the R.C.A.F. in the United Kingdom and the Far East from 1941 to 1945, he studied at the University of British Columbia, and obtained a degree of Bachelor of Applied Science, Geological Engineering, in 1950. In 1954, he obtained his Ph.D. from Princeton University. He was appointed to the staff of the British Columbia Department of Mines in 1951. Mr. Brown is a member of the Geological Society of

America, and Fellow of the Geological Association of Canada. He has done field work in the Cariboo Mountains and the Rocher Déboulé Range, as well as in the Queen Charlotte Islands.

* * *

Donovan Clemson (*British Columbia Lakes pictorial*) is a free-lance photographer living in British Columbia. His photographs have appeared in a number of Canadian publications, as well as in the *Canadian Geographical Journal*.

* * *

NOTE

We regret that in the June 1960 issue of the Journal, two photo credits were omitted. The pictures appearing in the article "Avalanche Control—Trans Canada Highway in Glacier National Park" by Hugh M. Millar are Department of Public Works photographs by Bruno Engler. The picture of Saint-Siméon on the front cover was reproduced by courtesy of the Canadian Government Travel Bureau.

AMONGST THE NEW BOOKS

Circumpolar Arctic Flora

by Nicholas Polunin

(Oxford University Press, Toronto.
514 pp. \$19.00).

The need for a *Circumpolar Arctic Flora* has long been felt not only by students of arctic botany, but by all those who for professional or other reasons are interested in circumpolar arctic plants and their distribution. In the past, several authors have contemplated or even commenced work on manuals of circumpolar flora, but the many and formidable difficulties besetting the task have, in the end, prevented their successful completion. One serious obstacle has been that botanical information on the Soviet sector of the Arctic — encompassing nearly half of the land area within the Arctic — has perhaps always been less complete, and certainly less accessible, than that of arctic Europe, Greenland and North America. For this reason alone no botanist today can claim sufficient knowledge to deal authoritatively with the entire holartic flora.

With the appearance of *Circumpolar Arctic Flora*, Polunin is to be congratulated for having produced a practical and beautifully illustrated manual that, with some justification,

(Continued on next page)

Information and Enquiries re Membership

We continue to receive enquiries about the qualifications required for membership in the Society. The answer is simple: we welcome as a member anyone who is interested in geography as we interpret it in the pages of the *Canadian Geographical Journal*—that is, the story of our land and how we live in it.

If you have enjoyed reading this issue please tell someone else about it so that he or she may know about the Society and the Journal. Or, nominate for membership anyone who you think would be interested and we will send him or her further information. For special persons, a gift membership is always appropriate.

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The Society regrets that its "geographical aspects" booklets on the provinces of Canada are temporarily out of print.

(Continued from previous page)

may claim to deal with all, or at least the majority of the better known flowering plants and ferns inhabiting the arctic (or in some cases subarctic) parts of the Northern Hemisphere.

Within its 514 pages *Circumpolar Arctic Flora* treats of 892 species of flowering plants and ferns distributed among 66 families and 230 genera. The arrangement followed is that of Engler & Prantl and the presentation of the material is conventional, beginning with a key to families followed by what may sometimes seem needlessly detailed descriptions of families and genera. Keys are provided for families represented by more than one genus and for genera containing more than nine species. These keys are diagnostic, often unduly elaborate, or at times so unwieldy that they entirely lose the character of keys, and, in the case of some large genera, become difficult to use. Thus the key to the genus *Carex* (sedge) takes up no less than 24 pages of double columns. Why, incidentally, no keys are provided for genera of less than nine species is not explained. Keys to genera are followed by a separate section in which the species

are arranged alphabetically by their technical names, followed by important synonyms, and English names. To the reviewer it seems doubtful if the effort and space devoted to providing English names for all species serves a useful purpose or is at all helpful. This is certainly true in the many instances when no English names existed and one had to be "manufactured", commonly by straight translation of the technical name into English, but often by such fanciful designations as when *Carex Lachenalii* is called "the Arctic Hare's foot Sedge" or when *Carex spathacea*, for no evident reason, is called "the Hopper Sedge".

For the purpose of citing geographical ranges the Arctic is divided into ten sectors (see map pp. viii-ix) and in the text the range of individual species is indicated by the appropriate sector or sectors from which Polunin has seen actual specimens. This scheme, while conserving in space, is not too satisfactory, and many users of the manual would, no doubt, have preferred distribution maps, no matter how small.

One feature of "Circumpolar Arctic
(Continued on page VII)



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(Continued from page V)

Flora", about which all users will be unanimous, is the illustrations. All, or nearly all, species are illustrated by line drawings of such excellence that by this feature alone most species can be readily identified. A good many of the illustrations are original and drawn specially for *Circumpolar Arctic Flora*. The paper and print is of the usual high standard of the Oxford University Press.

A. E. PORSILD

Dr. A. E. Porsild is Chief Botanist and Curator of Botany in the National Museum of Canada, Ottawa.

* * *

A Commercial Geography

by L. Dudley Stamp

(Longmans, Green and Company,
Toronto, 453 pp. \$2.55)

A Commercial Geography is the seventh edition of the book, first published in 1936. Originally written as the result of years of lecturing to local branches of the British Institute of Bankers, it was intended to demonstrate the author's point of view that "geography must be a key subject" because of "the interdependence of all parts of the modern world". The general plan and aim of the edition remains unaltered, although the text, statistics and diagrams have been carefully revised to bring them in line with recent developments.

N. L. NICHOLSON

Dr. Nicholson is director of the Geographical Branch of the Department of Mines and Technical Survey, Ottawa.

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Alaska Bound

by Kathryn Winslow

(Dodd, Mead and Company, New York, 481 pp. \$5.50)

Miss Winslow presents an exhaustive account of the land, sea and air routes and the overnight accommodation available to a visitor to the eight geographical regions of Alaska which she describes. Her book, unintentionally I feel, dispels any lingering impression that twentieth century tourism has bypassed the state. The knowledge that the New Seward Hotel in Seward has the enthusiastic recommendation of Duncan Hines and that the "Miss Arctic Circle" beauty contest is held in Kotzebue on the Fourth of July helps to leave the reader with the impression that Alaska from Point Barrow to Ketchikan is only a little less popular as a holiday region than the Niagara Peninsula at blossom time.

The book is a travelogue and certainly the author has provided a wealth of information on sightseeing objectives in the regions and towns which she describes. Too often, however, this intrinsically interesting material is obscured by detailed narration of the cost of travel, accommodation and meals on railways and at hotels and lodges throughout the state. For every reader who learns with interest that the Skagway Inn in Skagway does not have rooms with private bath and that the bus fare from Dawson City to Anchorage is \$81.65, a hundred readers, I am sure, will move quickly on to more fruitful pages. Prices and rates in effect at the time of writing had no doubt risen by the date of publication and have probably gone even higher since. Such information could more usefully be included in a Tourist Bureau handbook rather than in a popular travel book apparently published for the general reader.

A more serious fault is the total absence of suitable maps. Only one poorly drawn and wholly inadequate sketch map appears in the entire

book. Time after time the reader turns to it to locate a river or settlement mentioned in the text only to find that it does not appear. Surely good quality maps and sketches are essential to a book of this type.

Canadian readers will find a number of annoying errors of fact in the portions of the text dealing with the area of the Yukon Territory and British Columbia lying adjacent to Alaska. They will, for example, be surprised to learn that the Royal Canadian Mounted Police "has not been mounted for years" and that Dawson City and Dawson Creek are 2,500 miles apart. (The actual distance separating the two towns is 850 miles). Even the musk ox, a comparatively inoffensive creature, is found to be still suffering the reputation of an unfortunate and inappropriate name. We are told, incorrectly, that "when angered a musk ox gives off an overpowering, intensely disagreeable odor, which permeates the surrounding air for 300 or 400 feet".

The author obviously loves Alaska and knows it intimately. Her interest-

ing descriptions of scenic beauty spots and anecdotes about Alaskan history are all too brief to allow her appreciation of the land and its people to reach the reader. The result is an often tedious reading experience.

VICTOR W. SIM

Mr. Sim is a geographer working in the Northern Canada Section of the Department of Mines and Technical Surveys, Geographical Branch at Ottawa.

Recently Received from Publishers

Introduction to the Lakes. By F. L. Whitlark. (Greenwich Book Publishers, New York). This book helps Canadians to understand the value of the Great Lakes as a national trade asset. It presents information about the Lakes and their navigation in a most readable manner for everyone.

Britain, an Official Handbook. (Her Majesty's Stationery Office). This most comprehensive volume is prepared by the Central office of Information in London and offers in attractive form authentic data on British life and Government in every department.

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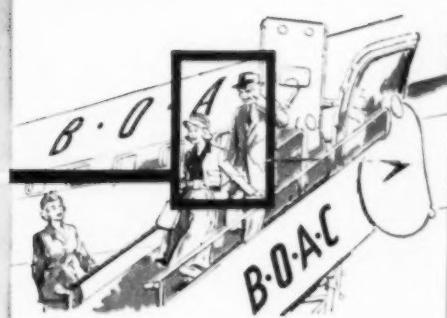
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